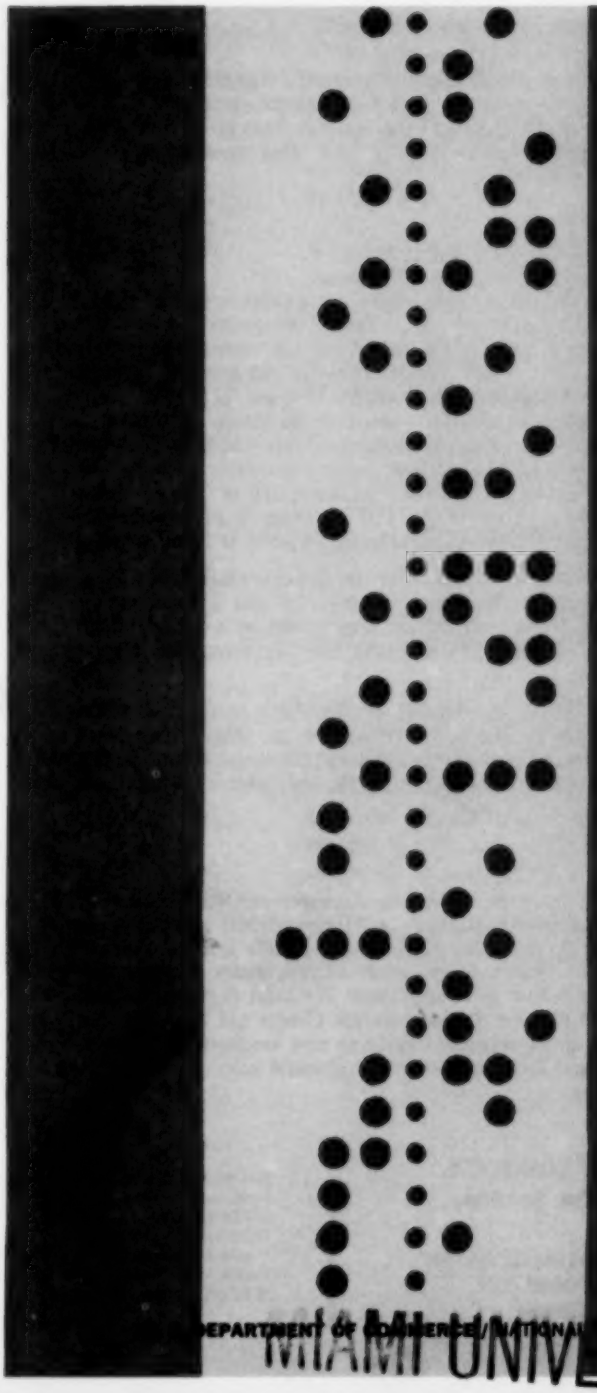
C 41.21:67/12

June 25, 1967

U.S. GOVERNMENT

RESEARCH & DEVELOPMENT REPORTS



A Semi-Monthly Abstract

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INDEX

All entries in USGRDR are indexed in the *Government-Wide Index to Federal Research & Development Reports (GWI)* published semi-monthly and sold on subscription by the Clearinghouse at $22.00 a year ($27.50 foreign). Single copy $3.00. Indexing data from current issues of announcement journals of the Atomic Energy Commission, National Aeronautics and Space Administration, and Defense Documentation Center are also included in this index to provide a single reference guide to new unclassified Government-sponsored research and development in the physical sciences, engineering, and related technology.

U.S. DEPARTMENT OF COMMERCE
Alexander B. Trowbridge, Secretary

CLEARINGHOUSE FOR FEDERAL SCIENTIFIC AND TECHNICAL INFORMATION
Bernard M. Fry, Director

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FOREWORD

U. S. GOVERNMENT RESEARCH AND DEVELOPMENT REPORTS is produced by computer from machineable records generated by four Federal agencies which announce R&D reports. Machineable records from the Atomic Energy Commission, the National Aeronautics and Space Administration, the Defense Documentation Center and the Clearinghouse for Federal Scientific and Technical Information are merged to produce USGRDR. All of the reports announced in USGRDR are indexed in the companion index, GOVERNMENT-WIDE INDEX TO FEDERAL RESEARCH & DEVELOPMENT REPORTS.

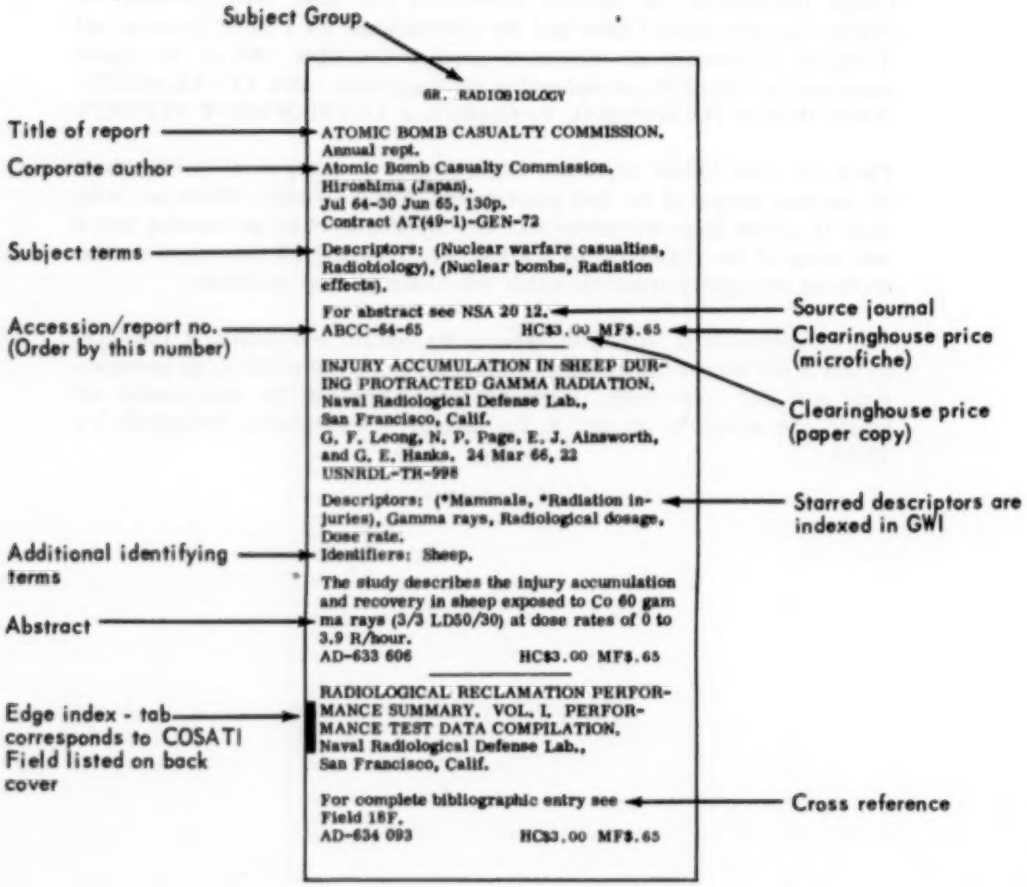
There are some format errors and inconsistencies in this journal resulting from the machine merger of the data generated by several agencies. Efforts are being made to correct these inconsistencies. The agencies involved are working with a task group of the Committee on Scientific and Technical Information to develop improved interagency standards which will eliminate these problems.

The Clearinghouse is striving to improve the content and format of USGRDR so that it will become increasingly valuable to the general public as an announcement tool and order guide. Comments and suggestions for improvement are invited and should be directed to the Director, Clearinghouse, Springfield, Va. 22151.

USGRDR FORMAT

Reports are announced under 22 subject categories called FIELDS. Each FIELD is divided into subcategories called GROUPS. Documents are listed alphanumerically by accession number within the GROUP. This classification system was adopted by the Committee on Scientific and Technical Information (COSATI) of the Federal Council on Science and Technology. The *COSATI Subject Category List* (AD–621 200) is available from the Clearinghouse at $3.00.

SAMPLE JOURNAL ENTRIES


Subject Group
6R. RADIOBIOLOGY
Title of report
ATOMIC BOMB CASUALTY COMMISSION. Annual rept.
Corporate author
Atomic Bomb Casualty Commission, Hiroshima (Japan).
Jul 64-30 Jun 65, 130p.
Contract AT(49-1)-GEN-72
Subject terms
Descriptors: (Nuclear warfare casualties, Radiobiology), (Nuclear bombs, Radiation effects).
For abstract see NSA 20 12.
Source journal
Accession/report no. (Order by this number)
ABCC-64-65
HC$3.00 MF$.65
Clearinghouse price (microfiche)
Clearinghouse price (paper copy)
INJURY ACCUMULATION IN SHEEP DURING PROTRACTED GAMMA RADIATION.
Naval Radiological Defense Lab., San Francisco, Calif.
G. F. Leong, N. P. Page, E. J. Ainsworth, and G. E. Hanks. 24 Mar 66, 22
USNRDL-TR-998
Descriptors: (*Mammals, *Radiation injuries), Gamma rays, Radiological dosage, Dose rate.
Starred descriptors are indexed in GWI
Additional identifying terms
Identifiers: Sheep.
Abstract
The study describes the injury accumulation and recovery in sheep exposed to Co 60 gamma rays (3/3 LD50/30) at dose rates of 0 to 3.9 R/hour.
AD-633 606
HC$3.00 MF$.65
Edge index - tab corresponds to COSATI Field listed on back cover
RADIOLOGICAL RECLAMATION PERFORMANCE SUMMARY, VOL. I. PERFORMANCE TEST DATA COMPILATION.
Naval Radiological Defense Lab., San Francisco, Calif.
For complete bibliographic entry see Field 18F.
Cross reference
AD-634 093
HC$3.00 MF$.65

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SUBJECT CATEGORY HEADINGS

Use Edge Index on back cover to locate COSATI Field in journal

COSATI FIELD

01 AERONAUTICS

Includes aerodynamics; aeronautics; aircraft; aircraft flight control and instrumentation; and air facilities.

02 AGRICULTURE

Includes agricultural chemistry; agricultural economics; agricultural engineering; agronomy and horticulture; animal husbandry; and forestry.

03 ASTRONOMY AND ASTROPHYSICS

Includes astronomy; astrophysics; and celestial mechanics.

04 ATMOSPHERIC SCIENCES

Includes atmospheric physics and meteorology.

05 BEHAVIORAL AND SOCIAL SCIENCES

Includes administration and management; documentation and information technology; economics; history, law and political science; human factors engineering; humanities; linguistics; man-machine relations; personnel selection, training, and evaluation; psychology (individual and group behavior); and sociology.

06 BIOLOGICAL AND MEDICAL SCIENCES

Includes biochemistry; bioengineering; biology; bionics; clinical medicine; environmental biology; escape, rescue, and survival; food; hygiene and sanitation; industrial (occupational) medicine; life support; medical and hospital equipment and supplies; microbiology; personnel selection and maintenance (medical); pharmacology; physiology; protective equipment; radiobiology; stress physiology; toxicology; and weapon effects.

07 CHEMISTRY

Includes chemical engineering; inorganic chemistry; organic chemistry; physical chemistry; and radio and radiation chemistry.

08 EARTH SCIENCES AND OCEANOGRAPHY

Includes biological oceanography; cartography; dynamic oceanography; geochemistry; geodesy; geography; geology and mineralogy; hydrology and limnology; mining engineering; physical oceanography; seismology; snow, ice, and permafrost; soil mechanics; and terrestrial magnetism.

09 ELECTRONICS AND ELECTRICAL ENGINEERING

Includes components; computers; electronic and electrical engineering; information theory; subsystems; and telemetry.

10 ENERGY CONVERSION (Non-Propulsive)

Includes conversion techniques; power sources; and energy storage.

COSATI FIELD

11 MATERIALS

Includes adhesives and seals; ceramics, refractories, and glasses; coatings, colorants, and finishes; composite materials; fibers and textiles; metallurgy and metallography; miscellaneous materials; oils, lubricants, and hydraulic fluids; plastics; rubbers; solvents, cleaners, and abrasives; and wood and paper products.

12 MATHEMATICAL SCIENCES

Includes mathematics and statistics and operations research.

13 MECHANICAL, INDUSTRIAL, CIVIL, AND MARINE ENGINEERING

Includes air conditioning, heating, lighting, and ventilating; civil engineering; construction equipment, materials, and supplies; containers and packaging; couplings, fittings, fasteners, and joints; ground transportation equipment; hydraulic and pneumatic equipment; industrial processes; machinery and tools; marine engineering; pumps, filters, pipes, tubing, fittings, and valves; safety engineering; and structural engineering.

14 METHODS AND EQUIPMENT

Includes cost effectiveness; laboratories, test facilities, and test equipment; recording devices; reliability; and reprography.

15 MILITARY SCIENCES

Includes antisubmarine warfare; chemical, biological, and radiological warfare; defense; intelligence; logistics; nuclear warfare; and operations, strategy, and tactics.

16 MISSILE TECHNOLOGY

Includes missile launching and ground support; missile trajectories; missile warheads and fuzes; and missiles.

17 NAVIGATION, COMMUNICATIONS, DETECTION, AND COUNTERMEASURES

Includes acoustic detection; communications; direction finding; electromagnetic and acoustic countermeasures; infrared and ultraviolet detection; magnetic detection; navigation and guidance; optical detection; radar detection; and seismic detection.

18 NUCLEAR SCIENCE AND TECHNOLOGY

Includes fusion devices (thermonuclear); isotopes; nuclear explosions; nuclear instrumentation; nuclear powerplants; radiation shielding and protection; radioactive wastes and fission products; radioactivity; reactor engineering and operation; reactor materials; reactor physics; reactors (power); reactors (non-power); and SNAP technology.

19 ORDNANCE

Includes ammunition, explosives; bombs; combat vehicles; explosions, ballistics, and armor; fire control and bombing systems; guns; rockets; and underwater ordnance.

20 PHYSICS

Includes acoustics; crystallography; electricity and magnetism; fluid mechanics; masers and lasers; optics; particle accelerators; particle physics; plasma physics; quantum theory; solid-mechanics; solid-state physics; thermodynamics and wave propagation.

21 PROPULSION AND FUELS

Includes air-breathing engines; combustion and ignition.

22 SPACE TECHNOLOGY

Includes astronautics; spacecraft; spacecraft trajectories and reentry; and spacecraft launch vehicles and ground support.

RESEARCH highlights

Reports of current high industrial interest

Highlighted documents, unless otherwise designated, are sold at the new unit price of $3.00 each, 65 cents microfiche.

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METALS, NONFERROUS

OXIDATION RESISTANCE OF SELECTED NONFERROUS METALS is not controlled by the transport of reacting species through an oxide scale or film, according to research conducted by scientists of Westinghouse Electric Corporation. The research was designed to extend and develop vacuum microbalance and electron diffraction methods for studying fast oxidation reactions of high temperature metals and solids under carefully controlled conditions of temperature, pressure, and gas flow; and to determine the kinetics and mechanisms of oxidation of a number of high temperature metals and solids. Limiting factors in the kinetics of oxidation for some reaction conditions include absorption of oxygen, desorption of the oxide, or chemical reaction of the adsorbed species. For other conditions the diffusion of oxygen molecules through a barrier layer of volatilized oxide vapors limits the rate of oxidation of these elements. Severe flow conditions, the nature of the reaction interface, and the nature of the reacting gases are important in determining the mechanism of the reaction. . . . . ORDER AD-650 638 -- STUDIES ON THE HIGH TEMPERATURE OXIDATION OF MOLYBDENUM, TUNGSTEN, NIOBIUM, TANTALUM, TITANIUM, AND ZIRCONIUM. . . . . E. A. Gulbransen et al., Westinghouse Electric Corp., Pittsburgh, Pa., for the Army, Apr. 67, 69p.

ELECTRONICS

METHODS FOR PACKAGING AND CONNECTING INTEGRATED CIRCUITS AT THE CHIP LEVEL have been developed by utilizing diffusion bonding of aluminum-to-aluminum conductors deposited on "H" film. In a continuing program to determine the most reliable and least costly method of integrated circuit packaging, scientists of Honeywell, Inc. have evaluated the use of diffusion bonding to achieve a "no-interface" connection in order to determine if it is a solution to failures being encountered by the brittle intermetallics at the interface. The researchers found that by use of the aluminum-to-aluminum technique, flying leads from circuit die to package header could be eliminated and a monometallic interconnection system could be maintained. The size, weight, and packaging density were significantly improved. The technique, however, can not compete in cost with an ultrasonic flip-chip bonding technique without development of a specialized machine. . . . . ORDER AD-651 545 -- A DIFFUSION BONDING PROGRAM. . . . . P. R. Clark and H. Baker, Honeywell, Inc., for the Air Force (RADC-TR-67-62), Apr. 67, 51p.

DATA PROCESSING

THE BROADENING OF SYSTEMS MANAGEMENT to include computer programs as well as equipment and facilities can provide a powerful tool for the technical manager. In an analysis of computer programs as an integral part of the overall system, researchers of the Air Force Electronic Systems Division conclude that these techniques can provide definitive design requirements and increase technical control in the design and development of computer programs. They improve the programmer's position in the design process by insuring that his requirements and interfaces are properly emphasized from the system's conception through its attainment of operational status. The researchers caution that, in applying the systems approach, computer programs cannot be equated with equipment; rather, the requirement for similar technical controls must be recognized with due consideration for the inherent differences between computer programs and equipment. . . . . ORDER AD-650 216 -- A SYSTEMS APPROACH TO COMPUTER PROGRAMS. . . . . J. L. Pokorney and W. E. Mitchell, Electronic Systems Division (ESD-TR-67-205), L. G. Hanscom Field, Bedford, Mass., Feb. 67, 24p.

PLASTICS

TWO NEW ELASTOMERS, REPRESENTING TWO NEW CLASSES OF POLYMER and two new types of crosslinking, have recently been tested and found to behave surprisingly like natural rubber and butadiene-styrene copolymer. In an investigation of poly(ethyl acrylate) and poly(dimethyl siloxane), scientists at Princeton University tested the network relaxation properties of the polymers in the rubbery plateau region. The researchers crosslinked poly(ethyl acrylate) during polymerization with difunctional groups, and post cured the poly(dimethyl siloxane), which contains pendant vinyl groups, with peroxide. The relaxation observed seemed to result from the continued approach to equilibrium of the network chains with cooperative thermal motion. . . . . ORDER AD-649 896 -- NETWORK RELAXATION PROPERTIES OF CROSSLINKED POLY(ETHYL ACRYLATE) AND POLY(DIMETHYL SILOXANE) IN THE RUBBERY PLATEAU REGION. . . . . L. H. Sperling and A. V. Tobolsky, Frick Chemical Lab., Princeton Univ., Princeton, N. J., Mar. 67, 13p.

RUBBER

FLUORINATED EPOXY OR URETHANE POLYMERS in several combinations show good resistance to paint-stripper solvents and good retention of mechanical properties and adhesion to aluminum substrate in tests to improve sealants for airplane fuselages. Scientists of Olin Mathieson Chemical Company prepared sealants by synthesizing monoglycidyl ethers of trifluoroethanol, and of 1,1-dihydro-pentadecafluoro-octanol, using them to oxyalkylate glycerine, condensing the resulting polyols with excess toluene diisocyanate, and curing them with atmospheric moisture or glycols. The first screening test for all compounds measured the tensile strength, the elongation and the swelling in solvents. Further testing of compounds meeting those requirements measured the adhesion to aluminum and the resistance to low temperatures. This testing established a set of rules or guidelines to make the needed compromise in the structure of the urethane in order to satisfy contradictory requirements. Compounds meeting all tests were recommended for further field tests. . . . . ORDER AD-650 315 -- DEVELOPMENT OF SOLVENT-RESISTANT SEALANTS. . . . . M. M. Boudakian et al., Olin Mathieson Chemical Corp., New Haven, Conn., for the Navy, Feb. 67, 48p.

MATERIALS DETERIORATION

THE EFFECTS OF DEEP OCEAN ENVIRONMENT ON MATERIALS from borers, bacteria, marine animals, and chemical reactions from mud and silt are being studied by scientists of the Naval Civil Engineering Laboratory in a continuing program to establish the best materials for deep ocean construction. The scientists first designed a Submersible Test Unit, a panel type structure for installation of specimens of materials, then submerged the STU on the sea floor in 2,370 feet of water. The 2,588 specimens of 811 materials attached to the STU included metals and metal alloys for the study of corrosion; and woods, ropes, glass, rubber, and plastics for studying biodeterioration. The scientists found that untreated wood, manila and cotton ropes, and burlap were most susceptible to total biological destruction. Rubbers, glass, certain types of plastics, and nylon showed resistance to deterioration at this particular ocean site. Some plastics showed a change in physical characteristics due to absorption of water, while others showed damage by borers. . . . . ORDER AD-651 124 -- DEEP-OCEAN BIODETERIORATION OF MATERIALS - PART VI. ONE YEAR AT 2,370 FEET. . . . . J. S. Muraoka, Naval Civil Engineering Lab. (R-525), Port Hueneme, Calif., May 67, 65p.

PLASMA TECHNOLOGY

AN EXPERIMENTAL STUDY OF LANDAU'S ELECTROSTATIC SPACE-CHARGE WAVES in isotropic hot electron plasmas shows full agreement between results and the fundamental solution of Landau's dispersion relation. Scientists of Stanford University have formulated the experiment by immersing pairs of parallel plane grids into a quiescent collision-free sodium plasma at thermodynamic equilibrium to excite and detect the waves. As plasma density and rf frequency were varied, the researchers scaled the measured wavelengths and spatial damping rates to Debye length using independent Langmuir probe data. The experiment quantitatively verifies a basic theoretical prediction: the propagation and damping of plasma oscillations due to electron thermal motions. . . . . ORDER AD-651 461 -- LANDAU WAVES. . . . . T. C. Simonen, Stanford Univ., Stanford, Calif., for the Aerospace Research Labs. (ARL 67-0012), Jan. 67, 158p.

WOOD AND PAPER

CONVERSION OF SOUTHERN PINE VENEER CORES into straight 8-foot 2 by 4's can be both economically feasible and practical, according to a study by the researchers of Southern Forest Experiment Station. The research was in five phases: (1) conversion by conventional skrag mill, (2) comparison of six other manufacturing methods, (3) evaluation of post-machining coatings to control crook and moisture content, (4) strength measurements on full-length studs, and (5) assessment of commercial feasibility. In the simplest method, recommended as a standard manufacturing process, veneer cores were center-ripped, dried, fully jointed on the flat face, thicknessed, and finally straight-line ripped to finished width. A possible annual production of 10,752,000 board feet of studs, selling for a gross increase of $.65 over the standard price for pulp chips, would make the investment a profitable one for a plywood plant . . . . . ORDER PB-174 455 -- STRAIGHT STUDS FROM SOUTHERN PINE VENEER CORES. . . . . P. Koch, Southern Forest Experiment Station, New Orleans, La., 1966, 43p.

TRANSPORTATION

DESIGNS FOR HIGH SPEED GROUND TRANSPORTATION SYSTEMS (HSGT) involve not only engineering, but also economics, political science, management, and urban planning, although development of engineering technologies are basic to the technical design problem. Engineers at the Massachusetts Institute of Technology are currently working on surveying the state of technology for HSGT aimed at evolving a general research plan for further development of significant aspects of ground transportation. The specific aspects covered during 1965-66 include scheduling, terminals, control, and switching; vehicle suspension systems; propulsion; and vehicle and tube aerodynamics. The engineers have summarized the results of reports covering these subjects, and listed the reports for detailed reference. . . . . ORDER PB-173 658 -- SUMMARY OF RESEARCH AT MIT ON HIGH SPEED GROUND TRANSPORT. . . . . W. W. Seifert and R. J. Hansen, Mass. Inst. of Tech., Cambridge, Mass., for the Dept. of Commerce, Dec. 66, 54p.

EXPERIMENTAL COMMERCIAL OPERATION of the nuclear ship SAVANNAH is described in a report prepared by the Maritime Administration, U. S. Department of Commerce. During its first year of commercial operation under a Bareboat Charter Agreement to First Atomic Ship Transport Inc. (FAST) (a subsidiary of American Export Isbrandtsen Lines), beginning August 20, 1965, the SAVANNAH completed a total of seven voyages between U. S. North Atlantic ports and ports on the Continent (TR 5-7-8-9) and the Mediterranean (TR 10). It cruised 72,000 miles, burning about 26 lbs. of uranium 235. Port calls were made at ports not previously visited by the ship, including Rota, Cadiz, Cartagena, and Bilbao, Spain; Genoa and Leghorn, Italy; and Marseilles, France. The ship carried 35,000 tons of cargo, with an average cubic utilization of 75 percent. The report gives a detailed breakdown of costs, operating experiences, and accomplishments of this pioneer nuclear merchant ship. ORDER PB-174 100 -- TECHNICAL, OPERATIONAL AND ECONOMIC REPORT OF THE NS SAVANNAH FIRST YEAR OF EXPERIMENTAL COMMERCIAL OPERATION 1965-1966, Maritime Administration, Washington, D. C., 70p.

THE COSTS OF MOVING COMMODITIES IN CARGO LINER SERVICE between U. S. and selected foreign ports have been developed and tabulated by Ernst and Ernst for the Department of Commerce. The researchers have developed the cost data at the lowest common denominator, the unit of commodity, rather than on a voyage-by-voyage basis, to allow better direct comparisons among dissimilar situations. The unit of commodity is defined as a measurement ton (MT) or 40 cubic feet. The figures were computed first by combining all direct and indirect costs of ship operations, except cargo handling costs, with voyage time and vessel space utilization statistics. Then, commodity cost rates were estimated by adding cargo handling costs specific to the commodity to the "rent" charge assignable to that commodity. The "rent" added recognized that ship space occupied exceeds the commodity cube due to ship configuration and the commodity's package and stowage method. In comparing the costs of transporting goods in United States and foreign flag ships, the researchers found that although U. S. ships were more costly to operate, higher overall utilization and better turnaround time compensated for the higher cost. . . . . ORDER PB-174 274 -- SELECTED COMMODITY UNIT COSTS FOR OCEANBORNE SHIPMENTS VIA COMMON CARRIERS (BERTH LINER). . . . . Ernst and Ernst, Washington, D. C. for the Dept. of Commerce, Mar. 67, 186p. Also available is PB-174 275 -- Same Title, APPENDIX TO REPORT. . . . . Mar. 67, 80p., containing figures for various selected trade routes.

SPACE TECHNOLOGY

HYPOTHESES OF CHARACTERISTICS OF THE PLANET MERCURY have undergone changes within recent years, according to a summary of existing literature by scientists of Redstone Scientific Information Center. Presupposing an increasing interest in Mercury as more is learned about planets within possible exploration range, the researchers have attempted to review existing information on rotation, temperature, atmosphere, surface, and terrain. Previous to 1965, nearly all astronomers believed that Mercury keeps one side toward the Sun, that the rotational period of the planet is the same as the orbital period, or "captured rotation." The majority of astronomers now do not accept this theory. The change in theory has changed several other hypotheses on surface temperatures. A tenuous atmosphere may have limited size and impact of meteorites on the surface, resulting in different surface materials and formation from those hypothesized previously. In spite of observation difficulties (Mercury's nearness to the Sun), astronomers have been able to establish diameter, mass, and density. An annotated bibliography is included in the study. . . . . ORDER AD-650 033 -- MERCURY ATMOSPHERE AND SURFACE. . . . . H. H. Hoop, Redstone Scientific Information Center (RSIC-633), Redstone Arsenal, Ala., Jan. 67, 89p.

RESEARCH & DEVELOPMENT REPORTS

1A. AERODYNAMICS

WIND TUNNEL INVESTIGATION OF AN ASPECT RATIO 10 TANDEM WING AIRCRAFT CONFIGURATION IN GROUND EFFECT. PART II. LATERAL CHARACTERIZATION,
David Taylor Model Basin Washington D C Aerodynamics Lab
For primary bibliographic entry see Field 1C.
AD-650 996 HC$3.00 MF$0.65

A HELICOPTER STRUCTURAL FLIGHT LOADS RECORDING PROGRAM.
Technology Inc Dayton Ohio
For primary bibliographic entry see Field 1C.
AD-651 134 HC$3.00 MF$0.65

FREE-MOLECULE FLOW AND SURFACE DIFFUSION THROUGH SLOTS AND TUBES A SUMMARY.
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
T. W. Reynolds, and E. A. Richley. Apr 67, 105p NASA-TR-R-255
Contract 120-26-02-10-22

Descriptors: *Circular tube, *Free flow, *Slot, *Surface diffusion effect, *Two-dimensional flow, Analysis, Circular, Cylinder, Diffusion, Dimension, Effect, Flow, Free, Gas, Model, Molecular, Numerical, Parallel, Phase, Surface, Transmission, Tube, Two, Wall.

For abstract, see STAR 05 11.
N67-22040 HC$3.00 MF$0.65

THE HYPERSONIC LOW DENSITY WIND TUNNEL OF THE AERODYNAMISCHE VERSUCHSANSTALT GOETTINGEN - OPERATIONAL BEHAVIOUR AND FIRST RESULTS ON REAL GAS EFFECTS IN NOZZLE FLOWS.
Der Hypersonische Vakuumwindkanal Der Aerodynamischen Versuchsanstalt Goettingen Betriebsverhalten Und Erste Ergebnisse Ueber Reale Gaseffekte in Duesenstroemungen
Aerodynamische Versuchsanstalt, Gottingen (West Germany). Abteilung Raumfahrt-aerodynamik.
G. Koppenwallner. Sep 66, 39p DLR-FB-66-62, AVA-FB-6612
in German, English Summary Presented At grr/ Wgtr Ann. Meeting, Bad Godesberg, West Germany, 4-8 Oct. 1966 Supported in Part By Bundesministeriums Fuer Wiss. Forsch.

Descriptors: *Hypersonic wind tunnel, *Nozzle flow, *Real gas, Aerodynamics, Behavior, Calibration, Condensation, Effect, Flow, Gas, Germany, Hypersonic, Low density, Measurement, Nozzle, Pressure, Real, Stagnation, Temperature, Test, Tunnel, Wind.

For abstract, see STAR 05 11.
N67-22134 HC$3.00 MF$0.65

THE INTERNAL STRUCTURE OF THE SHOCK WAVE. PART II - MULTICOMPONENT MIXTURES.
Politecnico Di Torino (Italy). Istituto Di Meccanica.
G. Jarre. Dec 65, 32p AFOSR-66-2596, TN-34
Contract AF-EOAR-63-98

Descriptors: *Gas mixture, *Shock wave, Binary, Coefficient, Diffusion, Flux, Gas, Internal, Mass, Mixture, Multicomponent, Property, Shock, Structure, Wave.

For abstract, see STAR 05 11.
N67-22447 HC$3.00 MF$0.65

SOME EXPERIMENTAL INVESTIGATIONS INTO THE DRAG EFFECTS OF MODIFICATIONS TO THE BLUNT BASE OF A BODY OF REVOLUTION.
Southampton Univ. (England). Inst. of Sound and Vibration Research.
M. J. Goodyer. Jul 66, 35p ISAV-150

Descriptors: *Base pressure, *Blunt body, *Body of revolution, *Drag effect, *Wind tunnel model, Base, Blunt, Body, Boundary, Disk, Drag, Effect, Laminar, Layer, Low speed, Magnetic, Measurement, Model, Pressure, Revolution, Slit, Suspension, Tunnel, Turbulent, Wind.

For abstract, see STAR 05 11.
N67-22502 HC$3.00 MF$0.65

THE APPLICATION OF KNOWN FLOW FIELDS TO THE DESIGN OF WINGS WITH LIFTING UPPER SURFACES AT HIGH SUPERSONIC SPEEDS.
Royal Aircraft Establishment, Farnborough (England).
K. C. Moore. Feb 65, 20p RAE-TR-65034

Descriptors: *Axisymmetric flow, *Flow field, *Supersonic speed, *Wing, Axisymmetry, Cruise, Flight, Flow, Planform, Speed, Stability, Supersonic, Surface.

For abstract, see STAR 05 11.
N67-22707 HC$3.00 MF$0.65

THE FORCES ON A COMPRESSION SURFACE BASED ON AN AXISYMMETRICAL CONICAL FLOW FIELD.
Royal Aircraft Establishment, Farnborough (England).
B. A. Woods. Oct 64, 19p RAE-TR-64035

Descriptors: *Axisymmetric flow, *Conical flow, *Drag, *Lift, *Pitching moment, Axisymmetry, Compression, Conical, Field, Flow, Force, Moment, Pitch, Surface.

For abstract, see STAR 05 11.
N67-22709 HC$3.00 MF$0.65

THE ELECTRIC-SPARK TECHNIQUE APPLIED TO THE MEASUREMENT OF VELOCITY IN A LEADING-EDGE VORTEX.
Royal Aircraft Establishment, Farnborough (England).
P. B. Earnshaw. Feb 64, 12p RAE-TN-AERO-2947, AD-441151

Descriptors: *Electric discharge, *Leading edge, *Velocity measurement, *Vortex flow, Aerodynamics, Air, Boundary, Ionized, Layer, Spark, Yaw.

For abstract, see STAR 05 11.
N67-22710 HC$3.00 MF$0.65

SUPERSONIC FLUTTER DERIVATIVES FOR A SERIES OF SWEPT AND CROPPED DELTA WINGS.
Royal Aircraft Establishment, Farnborough (England).
G. Z. Harris. Jan 66, 31p RAE-TR-66003

Descriptors: *Delta wing, *Supersonic flutter, *Swept wing, Crop, Delta, Derivative, Flutter, Heaving, Lifting, Pitch, Planform, Speed, Supersonic, Surface, Wing.

For abstract, see STAR 05 11.
N67-22720 HC$3.00 MF$0.65

WAKES, THEIR STRUCTURE AND INFLUENCE UPON AERODYNAMIC DECELERATORS.
Goodyear Aerospace Corp., Akron, Ohio.
I. M. Jaremenko. Apr 67, 69p NASA-CR-748
Contract NASW-1288

Descriptors: *Decelerator, *Flow characteristics, *Wake, Aerodynamics, Characteristics, Design, Drag, Flow, Stability.

For abstract, see STAR 05 11.
N67-22777 HC$3.00 MF$0.65

THE STABILITY OF A WIND TUNNEL MODEL ON FLEXIBLE SUPPORTS.
Royal Aircraft Establishment, Farnborough (England).
For primary bibliographic entry see Field 14B.
For abstract, see STAR 05 11.
N67-22783 HC$3.00 MF$0.65

CALCULATIONS OF TRANSIENT FORCES ON DELTA WINGS.
National Physical Lab., Teddington (England). Aerodynamics Div.
B. D. Dore. 29 Sep 65, 24p NPL-AERO-1033, ARC-27279

Descriptors: *Delta wing, *Gust load, *Incompressible flow, *Lift, *Transient pressure, Aspect, Coefficient, Delta, Finite, Flow, Function, Incompressible, Linear, Moment, Motion, Oscillation, Pressure, Ratio, Theory, Transient, Wing.

For abstract, see STAR 05 11.
N67-22784 HC$3.00 MF$0.65

GENERALISED AIRFORCES ON A CYLINDRICAL SHELL OSCILLATING HARMONICALLY IN A UNIFORM FLOW.
Royal Aircraft Establishment, Farnborough (England).
For primary bibliographic entry see Field 20K.
For abstract, see STAR 05 11.
N67-22788 HC$3.00 MF$0.65

A PROBLEM OF WING-BODY INTERFERENCE.
Aeronautical Research Committee (Gt. Brit.)
D. G. Randall. Mar 63, 25p ARC-CP-704, RAE-AERO-2676

Descriptors: *Incidence, *Supersonic flow, *Wing body, Body, Circular, Cylinder, Delta, Distribution, Downstream, Edge, Flow, Inviscid, Leading, Pressure, Subsonic, Supersonic, Upstream, Wing, Zero.

For abstract, see STAR 05 11.
N67-22789 HC$3.00 MF$0.65

SUPERSONIC WIND TUNNEL MEASUREMENTS OF THE LOADS AND INTERNAL PRESSURE DISTRIBUTIONS ON DUSTS AT INCIDENCE.
Aeronautical Research Council (Gt. Brit.)
P. H. Cook. Feb 64, 66p ARC-CP-768, RAE-TN-AERO-2951

Descriptors: *Duct, *Incidence, *Load distribution, *Pressure distribution, *Supersonic wind tunnel, Circular, Cross section, Distribution, Engine, Internal, Lift, Load, Measurement, Nacelle, Pressure, Rectangle, Supersonic, Tunnel, Wind.

For abstract, see STAR 05 11.
N67-22790 HC$3.00 MF$0.65

ON FORWARD EJECTION FOR THERMAL INSULATION IN HYPERSONIC FLIGHT.
Aeronautical Research Council (Gt. Brit.)
M. G. Hall. Aug 63, 20p ARC-CP-752, RAE-TN-AERO-2910

Descriptors: *Gas stream, *Hypersonic flight, *Thermal insulation, Body, Constant, Ejection, Flight, Flow, Forward, Gas, Heat transfer, Hypersonic, Insulation, Orifice, Pressure, Profile, Stream, Supersonic, Surface, Thermal.

For abstract, see STAR 05 11.
N67-22795 HC$3.00 MF$0.65

THEORETICAL STUDY OF THE ROLLING RESPONSE OF AIRCRAFT TO TURBULENT AIR.
Aeronautical Research Council (Gt. Brit.)
J. K. Zborzek. Apr 61, 44p ARC-R+M-3423, RAE-TN-AERO-2753

Descriptors: *Aircraft configuration, *Lateral stability and control, *Turbulent air current, Air, Aircraft, Approach, Configuration, Continuous, Control, Current, Discrete, Gust, Lateral, Pilot, Response, Roll, Size, Speed, Stability, Theory, Turbulent.

For abstract, see STAR 05 11.
N67-22796 HC$3.00 MF$0.65

A NOTE ON THE ESTIMATION OF THE EFFECT OF WIND TUNNEL WALLS ON THE FORCES OF SLOWLY OSCILLATING SLENDER WINGS.
Aeronautical Research Council (Gt. Brit.)
W. E. Acum. Apr 63, 14p ARC-CP-707, NPL-AERO-1014

Descriptors: *Oscillating wing, *Slender wing, *Subsonic flow, *Wind tunnel wall, Aerodynamic, Circular, Effect, Flow, Force, Formula, Interference, Oscillation, Rectangle, Slender, Slow, Subsonic, Tunnel, Wall, Wind, Wing.

For abstract, see STAR 05 11.
N67-22797 HC$3.00 MF$0.65

THE PRESSURE DISTRIBUTION AT ZERO-LIFT ON SOME SLENDER DELTA WINGS AT SUPERSONIC SPEEDS.
Aeronautical Research Council (Gt. Brit.)
M. C. Firmin. Nov 63, 36p ARC-CP-774, RAE-TN-AERO-2926

Descriptors: *Pressure distribution, *Slender wing, *Supersonic speed, *Zero lift, Cross section, Delta, Distribution, Drag, Edge, Gradient, Inviscid, Lift, Measurement, Perturbation, Pressure, Slender, Speed, Supersonic, Theory, Thickness, Trailing, Wave, Wing, Zero.

For abstract, see STAR 05 11.
N67-22799 HC$3.00 MF$0.65

CONCENTRATION MEASUREMENTS OF AN INJECTED GAS IN A SUPERSONIC STREAM.
National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
M. G. Torrence. Apr 67, 44p NASA-TN-D-3860 Contract 124-10-02-04-23

Descriptors: *Air current, *Ethane, *Gas injection, *Supersonic flow, *Tracer, Air, Concentration, Current, Flow, Gas, Injection, Jet, Measurement, Stream, Supersonic.

For abstract, see STAR 05 11.
N67-22862 HC$3.00 MF$0.65

STUDYING THE GROUND-EFFECT IN WIND-TUNNELS.
Etude en Soufflerie de L'effect de Sol
Applicazioni E Ricerche Scientifiche, Naples (Italy). Office National D Etudes Et de Recherches Aerospatiales, Paris (France). -8
A. De Sievers. Dec 66, 53p ONERA-TN-87
in French, English Summary

Descriptors: *Delta wing, *Ground effect, *Slender wing, *Wind tunnel model, Aircraft, Boundary, Delta, Drag, Effect, Fixed, Flow, Ground, Image, Layer, Lift, Method, Model, Slender, Test, Tunnel, Wall, Wind, Wing.

For abstract, see STAR 05 11.
N67-22903 HC$3.00 MF$0.65

DECAY OF TURBULENT AXISYMMETRICAL FREE FLOWS WITH ROTATION.
Israel Inst. of Tech., Haifa.
A. Chervinsky, and D. Lorenz. 1967, 26p TAE-55

Descriptors: *Axisymmetric flow, *Free jet, *Rotational flow, *Swirling wake, *Turbulent flow, Approximation, Axisymmetry, Boundary, Decay, Differential, Equation, Flow, Free, Integration, Jet, Layer, Numerical, Rotation, Swirl, Turbulent, Velocity, Wake.

For abstract, see STAR 05 11.
N67-22916 HC$3.00 MF$0.65

DETERMINATION OF WING EFFECTS ON NORMAL BODY FORCES FOR WING-BODY COMBINATIONS AT SUPERSONIC SPEED.
Zur Bestimmung Der Fluegeleinfluesse Auf Die Rumpfnormalkraefte Bei Fluegel-rumpf- Kombinationen Im Ueberschall
Eidgenossische Technische Hochschule, Zurich (Switzerland).
A. G. Mona. 1965, 191p PROM.-3785
in Swiss

Descriptors: *Aerodynamic force, *Interference lift, *Supersonic speed, *Wing-fuselage combination, Aerodynamic, Bibliography, Body, Calculation, Combination, Downwash, Drag, Effect, Experiment, Field, Flow, Force, Fuselage, Interference, Lift, Missile, Sideslip, Slender, Speed, Supersonic, Turbulence, Wing.

For abstract, see STAR 05 11.
N67-22926 HC$3.00 MF$0.65

MAGNETOHYDRODYNAMIC TRANSPORATION COOLING.
National Aeronautical Lab., Bangalore (India).
N. Rudraiah. Oct 66, 19p TN-PH-4-66

Descriptors: *Aerodynamic heating, *Incompressible fluid, *Magnetohydrodynamics, *Transpiration cooling, *Viscous fluid, Aerodynamic, Calculation, Coefficient, Cooling, Distribution, Effect, Equation, Field, Flow, Fluid, Heat transfer, Heating, Incompressible, Magnetic, Pressure, Sphere, Temperature, Transpiration, Viscous.

For abstract, see STAR 05 11.
N67-22937 HC$3.00 MF$0.65

USE OF POLYNOMIAL APPROXIMATIONS IN DIGITAL COMPUTERS FOR SOLUTION OF AIR DATA FORMULAE.
Royal Aircraft Establishment, Farnborough (England).
M. R. Green, and R. M. Horner. Jul 66, 31p RAE-TR-66230

Descriptors: *Aerodynamic characteristics, *Approximation method, *Computer program, Aerodynamic, Air, Air speed, Altitude, Approximation, Characteristics, Computer, Digital, Least, Mach number, Method, Polynomial, Program, Square.

For abstract, see STAR 05 11.
N67-22948 HC$3.00 MF$0.65

ON ONE-DIMENSIONAL FRICTIONLESS COMPRESSIBLE GAS FLOW WITH HEAT ADDITION AND AREA CHANGE UNDER PARTICULAR CONSIDERATION OF TRANSONIC REGIME.
Zur Eindimensionalen, Reibungsfreien, Kompressiblen Gasstroemung Mit Aufheizung Und Querschnittsaenderung Bei Besonderer Beruecksichtigung des Schalldurchgangs
Deutsche Versuchsanstalt Fur Luft- Und Raumfahrt, Stuttgart (West Germany). Inst. Fuer Plasmadynamik.
S. Krause. Jan 67, 82p DLR-FB-67-02
in German

Descriptors: *Compressible flow, *One-dimensional flow, *Rare gas, *Transonic flow, Area, Compressible, Dimensional, Distribution, Flow, Gas, Heat transfer, One, Rare, Transonic.

For abstract, see STAR 05 11.
N67-22966 HC$3.00 MF$0.65

DENSITY DISTRIBUTION OF A MOLECULAR FLUX FROM A SHORT CYLINDRICAL TUBE.
Toronto Univ. (Ontario). Inst. for Aerospace Studies.
J. H. De Leeuw, and E. O. Gadamer. Feb 67, 55p UTIAS-TN-103

Descriptors: *Density distribution, *Low pressure chamber, *Molecular flow, Air, Calculation, Chamber, Connector, Cylinder, Density, Distribution, Emergence, Flow, Fluid, Flux, Gas, Jet, Low density, Low pressure, Molecular, Radial, Tube.

For abstract, see STAR 05 11.
N67-23001 HC$3.00 MF$0.65

ANNUAL PROGRESS REPORT, 1966.
Toronto Univ. (Ontario). Inst. for Aerospace Studies.
Oct 66, 254p NP-16419

Descriptors: *Binary mixture, *Free molecular flow, *Gas dynamics, *Shock wave, *Transport property, Argon, Binary, Diffusion, Dynamics, Flow, Free, Gas, Helium, Jet, Mixture, Molecular, Nitrogen, Property, Separation, Shock, Structure, Transport, Wave.

For abstract, see STAR 05 11.
N67-23205 HC$3.00 MF$0.65

EXPERIMENTS ON THE ACCOMMODATION OF NORMAL MOMENTUM.
Royal Aircraft Establishment, Farnborough (England).
W. N. Colligon Σmair, B. W. Viney, and S. Aug 66, 19p RAE-TR-66246
Presented At the 5th Intern. Symp. on Rarefied Gas Dyn., Oxford 4-8 Jul. 1966

Descriptors: *Molecular beam, *Momentum transfer, *Nitrogen, Accommodation, Balance, Beam, Coefficient, Copper, Drag, Energy, Force, Ion, Measurement, Molecular, Momentum, Normal, Recoil, Target, Torsion.

For abstract, see STAR 05 11.
N67-23240 HC$3.00 MF$0.65

FREE-FLIGHT TESTING IN HIGH-SPEED WIND TUNNELS.
Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
B. Dayman, Jr. May 66, 99p
AGARDOGRAPH-113

Descriptors: *Free flight test apparatus, *Hypervelocity wind tunnel, Acquisition, Apparatus, Damping, Data, Drag, Facility, Flight, Flow, Free, High speed, Hypervelocity, Launching, Model, Motion, Pitch, Reduction, Technique, Test, Trajectory, Tunnel, Wake, Wind.

For abstract, see STAR 05 11.
N67-23241 HC$3.00 MF$0.65

TRANSONIC STABILITY OF FIN AND DRAG STABILIZED PROJECTILES.
Canadian Armament Research and Development Establishment, Valcartier (Quebec).
B. Cheers. May 66, 39p AGARD-542
Presented At Agard Fluid Dyn. Panel Specialists' Meeting, Rhode-saint-genese, Belgium, 10-13 May 1966

Descriptors: *Aerodynamic stability, *Hypervelocity projectile, *Supersonic drag, *Transonic speed, Aerodynamic, Antitank, Characteristic, Conference, Drag, Fin, Hypervelocity, Nose, Point, Projectile, Speed, Spike, Stability, Supersonic, Trajectory, Weapon.

For abstract, see STAR 05 11.
N67-23245 HC$3.00 MF$0.65

CHANGES IN THE FLOW AT THE BASE OF A BLUFF BODY DUE TO A DISTURBANCE IN ITS WAKE.
Bristol Siddeley Engines, Ltd. (England).
R. Hawkins, and E. G. Trevett. May 66, 27p AGARD-539
Presented At Agard Specialists' Meeting on Separated Flows, Rhode-saint-genese, Belgium, 10-13 May 1966

Descriptors: *Bluff body, *Free stream, *Mach number, *Shock wave, *Turbulent wake, Base, Bluff, Body, Conference, Cylinder, Disturbance, Flow, Free, Interaction, Shock, Stream, Transition, Turbulent, Wave.

For abstract, see STAR 05 11.
N67-23249 HC$3.00 MF$0.65

THEORETICAL STUDY OF NATURAL CONVECTION FLOWS IN CLOSED-END CYLINDRICAL VESSELS FINAL REPORT.
Denver Research Inst., Colo.
For primary bibliographic entry see Field 20M.
For abstract, see STAR 05 11.
N67-23254 HC$3.00 MF$0.65

CONTRIBUTION OF DOWNSTREAM STATOR TO THE INTERACTION NOISE OF A SINGLE-STAGE AXIAL-FLOW COMPRESSOR.
National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
W. L. Copeland, J. L. Crigler, and A. C. Dibble, Jr.. Apr 67, 20p NASA-TN-D-3892
Contract 126-16-03-01-23

Descriptors: *Axial flow compressor, *Noise reduction, *Stator, Axial, Blade, Compressor, Downstream, Flow, Frequency, Guide, Inlet, Noise, Pattern, Radiation, Reduction, Rotor, Spectrum, Vane.

For abstract, see STAR 05 11.
N67-23288 HC$3.00 MF$0.65

HYPERSONIC PERFORMANCE OF SEVERAL BASIC AND MODIFIED DIAMOND CROSS-SECTION DELTA WING CONFIGURATIONS.
National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
L. Neal, Jr., and L. M. Weinstein. Apr 67, 29p NASA-TN-D-3894
Contract 129-01-09-03-23

Descriptors: *Delta wing, *Diamond wing, *Hypersonic flight, Aerodynamic, Characteristics, Delta, Diamond, Drag, Flight, Hypersonic, Lift, Performance, Ratio, Tunnel, Wind, Wing.

For abstract, see STAR 05 11.
N67-23290 HC$3.00 MF$0.65

LONGITUDINAL AERODYNAMIC CHARACTERISTICS OF SEVERAL HIGH-DRAG BODIES AT MACH NUMBERS FROM 1.50 TO 4.63.
National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
J. F. Campbell. Apr 67, 34p NASA-TN-D-3915
Contract 124-08-06-03-23

Descriptors: *Longitudinal stability, *Planetary entry, *Reentry body, *Static aerodynamic characteristics, Aerodynamic, Body, Characteristics, Cone, Design, Drag, Entry, Lift, Longitudinal, Pitch, Planetary, Reentry, Shell, Spacecraft, Stability, Static.

For abstract, see STAR 05 11.
N67-23295 HC$3.00 MF$0.65

STABILITY AND DRAG CHARACTERISTICS AT MACH NUMBERS OF 10 AND 26 OF A PROPOSED SLENDER ATMOSPHERIC PROBE.
National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
G. N. Malcolm. Apr 67, 37p NASA-TN-D-3917
Contract 124-07-02-13-00-21

Descriptors: *Aerodynamic stability, *Drag, *Mars probe, *Slender body, Cone, Cylinder, Field, Flow, Moment, Pitch, Shock, Wave.

For abstract, see STAR 05 11.
N67-23296 HC$3.00 MF$0.65

HOT-WIRE ANEMOMETERS AT CONSTANT TEMPERATURE.
Anemometres A Fil Chaud A Temperature Constante
Centre National de La Recherche Scientifique, Meudon (France). Laboratoire D'aerothermique.
R. Galinaro, and P. Gougat. Nov 66, 24p REPT.-66-11, PUBL.-283
in French

Descriptors: *Correlation coefficient, *Hot-wire anemometer, *Turbulent flow, *Wire bridge circuit, Anemometer, Bridge, Circuit, Coefficient, Constant, Correlation, Current, Electric, Flow, Heat transfer, Hot wire, Measurement, Resistance, Temperature, Turbulent, Velocity, Wheatstone bridge, Wire.

For abstract, see STAR 05 11.
N67-23395 HC$3.00 MF$0.65

1B. AERONAUTICS

COMPUTER/SIMULATION STUDY OF AIR-DERIVED SEPARATION ASSURANCE SYSTEMS IN MULTIPLE AIRCRAFT ENVIRONMENT.
Interim rept. no. 2,
Collins Radio Co Cedar Rapids Iowa
R. D. Joy, D. E. Killham, and L. K. Belden. Mar 66, 209p
FAA-RD-65-35
Contract FA-WA-4598

Descriptors: (*Aviation accidents, Warning systems), Synchronization (Electronics), Flight simulators, Separation, Environment, Aircraft, Pilots, Computers, Flight instruments.

The performance of two classes of air-derived separation assurance systems (ADSAS) were investigated by analytical means, and the most promising system was further studied by computer simulation methods. The two ADSAS classes studied were the range-altitude (R-A) technique using as a primary hazard predictor, tau, the ratio of range to range-rate and the relative position-velocity technique using both tau and the normal velocity component as hazard predictors. Primary emphasis was placed upon the R-A system using time/frequency ranging techniques. The parameters of this system were varied to maximize its performance. It was concluded: Range-altitude systems based upon the use of time/frequency ranging techniques showed hazard prediction performance superior to those available from the ground-bounce ranging techniques or the relative position-velocity system based upon interrogation-transponder ranging techniques. The time/frequency R-A system gives adequate rectilinear flight performance with rms range measurement errors of 2000 feet and range-rate errors of 30 feet per second. While the simple R-A system will offer complete protection in rectilinear flight regimes, it has serious deficiencies in turning encounters. The use of projection techniques can provide adequate protection for all expected encounters in both en route and terminal areas.
AD-650 821 HC$3.00 MF$0.65

SUMMARY OF SHORT-PERIOD TERMINAL WEATHER INFORMATION STUDIES.
Travelers Research Center Inc Hartford Conn
For primary bibliographic entry see Field 4B.
AD-650 826 HC$3.00 MF$0.65

ANALYSIS OF ARMY FIXED-WING CARGO RESTRAINT DESIGN CRITERIA.
Aviation Safety Engineering and Research Phoenix Ariz
For primary bibliographic entry see Field 1C.
AD-651 219 HC$3.00 MF$0.65

MEASUREMENTS OF "AQUAPLANING HEIGHT" ON A METEOR AIRCRAFT, AND PHOTOS OF FLOW PATTERN UNDER A MODEL TYRE.
Aeronautical Research Council (Gt. Brit.)
W. E. Gray. Nov 62, 11p ARC-CP-717, RAE-TN-AERO-2855

Descriptors: *Flow pattern, *Hydroplane, *Meteor aircraft, Distortion, Flow, Gap, High speed, Layer, Measurement, Model, Pattern, Photograph, Runway, Thickness, Tire, Velocity, Water.

For abstract, see STAR 05 11.
N67-22791 HC$3.00 MF$0.65

SIMULATION OF GROUND CONTROLLED APPROACHES WITH REFERENCE TO CERTAIN ACCIDENTS.
Queens Univ., Belfast (Northern Ireland).
K. J. Holden. Feb 63, 50p ARC-CP-748, ARC-24545
50 P Refs

Descriptors: *Aircraft accident, *Approach and landing, *Computer simulation, *Ground control, Accident, Aircraft, Analog, Approach, Computer, Control, Defect, Elevator, Error, Ground, Height, Landing, Pilot, Simulation, Speed, System, Throttle.

For abstract, see STAR 05 11.
N67-22800 HC$3.00 MF$0.65

USE OF A LARGE JET TRANSPORT AS AN INFLIGHT DYNAMIC SIMULATOR.
National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
H. L. Crane, and W. M. Eldridge. May 66, 30p NASA-TM-X-59620, AGARD-528
Presented At the 28th Meeting of the Agard Flight Mech. Panel, Paris, 10-11 May 1966

Descriptors: *Approach and landing, *Flight simulator, *Low speed handling, *Supersonic transport, Approach, Boeing 707 aircraft, Characteristic, Conference, Configuration, Drag, Dynamic, Flight, Handling, Jet, Landing, Lift, Longitude, Low speed, Modification, Quality, Reverser, Simulator, Supersonic, Thrust, Transport.

For abstract, see STAR 05 11.
N67-23243 HC$3.00 MF$0.65

1C. AIRCRAFT

SYMPOSIUM ON PARACHUTE TECHNOLOGY AND EVALUATION, PROCEEDINGS. VOLUME I.
Technical documentary rept.,
Air Force Flight Test Center, Edwards AFB, Calif.
Earl C. Myers. 12 Sep 64, 422p FTC-TDR-64-12-Vol-1
See also AD-452 431.

Descriptors: (*Parachutes, Symposia), Drag parachutes, Deceleration, Recovery, Gliders, Balloons, Rotorchutes, Rotary wings, Escape systems (Aerospace), Floats, Landing impact, Parachute descents, Retro rockets, Predictions, Design, Test methods, Test vehicles, Ejection seats, Reliability.
Identifiers: Paracones, Paragliders, Paravolcoons.

Papers presented at the symposium in the following areas are reproduced: new aerodynamic deceleration development (7 papers); new parachute design techniques (6 papers); evaluation devices and techniques (6 papers); escape system developments (7 papers). The talks given at the opening session are also included.
AD-452 430 HC$3.00

SYMPOSIUM ON PARACHUTE TECHNOLOGY AND EVALUATION, PROCEEDINGS. VOLUME II.
Technical documentary rept.,
Air Force Flight Test Center, Edwards AFB, Calif.
Earl C. Myers. 12 Sep 64, 180p FTC-TDR-64-12-Vol-2
See also AD-452 430.

Descriptors: (*Parachutes, Symposia), Parachute fabrics, Escape systems (Aerospace), Recovery, Air-sea rescues, Lifeboats, Space environmental conditions, Manned spacecraft, Soft landings, Drag parachutes, Gliders, Ballistics, Landing impact, Parachute descents, Spin-recovery parachutes.
Identifiers: Apollo, Parasails.

Contents include: Unique flexible fibrous material for decelerators; Analysis of an intergrated spacecraft escape system; Unmanned water-to-air recovery system; The effect of space environment on textile materials; Studies of the influence of properities on the landing characteristics of manned spacecraft' Attenuation of deployment and opening forces of certain aerodynamic decelerators; Recovery dynamics for Appollo; Development of the para-sail parachute as a landing system for manned spacecraft; Application of ballistics to precisely control the opening of parachutes, the ultra precision parachute; Attenuation of landing impact for manned spacecraft' Controlled landings with steerable parachutes; Forcible deployment and development of large recovery parachutes for low altitude airdrop of heavy equipment; Flat spin recovery system.
AD-452 431 HC$3.00

WAVE PUMPING AND ITS EFFECTS ON THE DESIGN AND OPERATION OF AIR-CUSHION SHIPS.
Navy Marine Engineering Lab Annapolis Md
For primary bibliographic entry see Field 13J.
AD-650 669 HC$3.00 MF$0.65

ON THE SIGNIFICANCE OF THE SUPPORTS WHEN CALIBRATING STRAIN GAUGE INSTALLATIONS FOR MEASURING LOADS ON A CRAFT.
Technical rept.,
Royal Aircraft Establishment Farnborough (England)
D. A. Drane. Sep 66, 12p Rept no. TR-66293

Descriptors: (*Strain gages, Calibration), (*Aircraft, Loading (Mechanics)), Great Britain, Measurement, Test methods.

When calibrating strain gauge installations for measuring flight loads in the way suggested by Skopinski and others, the strain distribution and hence the gauge responses resulting from the application of a load to part of the structure will be affected by the position of the supports on which the aircraft rests. It is, however, shown that if the aircraft is supported so that the reactions are statically determinate, the response of any strain gauge to a particular loading system is the integral of the products of the elemental loads imposed by that system and the gauge responses obtained from the ground test. In consequence, the theoretical linear combination of strain gauges which measures exactly the load sustained by the structure and which is based on data obtained from the ground test is invariant with changes in the positions of the supports and thus may be used to measure loads applied in flight or in any other condition. In practice, the positions of the supports should be chosen with due regard for the strength and stability characteristics of the structure and for the idiosyncracies of the strain gauge responses. (Author)
AD-650 672 HC$3.00 MF$0.65

PRELIMINARY DESIGN OF WATER-JET PROPULSION SYSTEMS FOR 4000-TON CAPTURED AIR BUBBLE (CAB) SHIP.
Navy Marine Engineering Lab Annapolis Md
For primary bibliographic entry see Field 13J.
AD-650 685 HC$3.00 MF$0.65

INVESTIGATION OF SOLID LUBRICANTS FOR HELICOPTER TRANSMISSIONS.
Westinghouse Research Labs Pittsburgh Pa
For primary bibliographic entry see Field 11H.
AD-650 763 HC$3.00 MF$0.65

SURVEY ON SEAPLANE HYDRO-SKI DESIGN TECHNOLOGY. PHASE I: QUALITATIVE STUDY,
Edo Corp College Point N Y
P. A. Pepper, and L. Kaplan. 23 Dec 66, 122p Rept no. 7489-1
Contract N00014-66-C-0126

Descriptors: (*Seaplanes, Hydro-skis), (*Hydro-skis, Reviews), Design, Analysis, Stability, Take-off, Landings, Configuration.
Identifiers: Hydro-skis seaplanes.

The report is the first part of a two-phase study for the survey and analysis of hydro-ski seaplane technology. As such, it contains qualitative correlations of the results of As such, it contains qualitative correlations of the results of all data to define optimum hydro-ski shape, spray characteristics, and longitudinal, lateral, and directional stability during take-off and landing. A bibliography of hydro-ski technology is also included. (Author)
AD-650 769 HC$3.00 MF$0.65

EVALUATION OF FLIGHT FIRE PROTECTION MEANS FOR INACCESSIBLE AIRCRAFT BAGGAGE COMPARTMENTS.
Technical Development and Evaluation Center Indianapolis Ind
For primary bibliographic entry see Field 13L.
AD-650 923 HC$3.00 MF$0.65

WIND TUNNEL INVESTIGATION OF AN ASPECT RATIO 10 TANDEM WING AIRCRAFT CONFIGURATION IN GROUND EFFECT. PART II. LATERAL CHARACTERIZATION,
David Taylor Model Basin Washington D C Aerodynamics Lab
Lynn A. Trobaugh, and Charles W. Harry. Jan 67, 53p Rept no. Aero-1111-2
DTMB-2259-2
See also AD-641 246.

Descriptors: (*Wing-body configurations, Aspect ratio), (*Roll, Aircraft), Wind tunnel models, Ground effect, Angle of attack, Center of gravity, Aerodynamic characteristics, Model tests, Subsonic flow.

Subsonic wind tunnel test results obtained to determine the lateral aerodynamic characteristics of a tandem wing aircraft model in and out of ground effect are given. Test variables included model height above a ground board, model angle of attack, model angle of sideslip, and center-of-gravity location. Ground effect causes large sideslip-induced rolling moments (dihedral effect) on the model, which can be moderated by altering the size of the vertical tail. It is also possible that the large dihedral effect would be moderated by the roll stiffness term. However, roll stiffness data were not obtained for this model. (Author)
AD-650 996 HC$3.00 MF$0.65

DYNAMIC ANALYSIS OF THE TETHERING CABLE PORTION OF A HIGH ALTITUDE TETHERED BALLOON SYSTEM UNDER FULLY DEPLOYED CONDITIONS.
Final rept.,
National Engineering Science Co Pasadena Calif
A. Soldate. Oct 66, 94p Rept no. NESCO-S-344
Contract N00014-66-C-0187, ARPA Order-756

Descriptors: (*Cables (Mechanical), *Balloons), High altitude, Mechanical properties, Dynamics, Environmental tests, Computer programs, Aircraft control cables, Glass textiles, Balloon equipment.

A computer study has been made of nonsteady aerodynamic loadings on a long, cylindrical cable of the continuous glass fiber-resin type used as a tether for a balloon at altitudes of approximately 100,000 feet. No important interactions between torsional, longitudinal, and lateral modes were found. Furthermore, the effects of lateral loadings from gusts or wortex sheddings were found to be unimportant. Computer programs are presented that enable computations to be made of cable motions resulting from localized gust loadings and from vortex shedding phenomena. (Author)
AD-651 024 HC$3.00 MF$0.65

ELASTIC-PLASTIC RESPONSE OF STRUCTURES TO BLAST AND IMPULSE LOADS.
J G Engineering Research Associates Baltimore Md
For primary bibliographic entry see Field 13M.
AD-651 051 HC$3.00 MF$0.65

STUDY OF DETERMINE DESIGN CRITERIA FOR A STEREO FIBER OPTIC PERISCOPE FOR AIRCRAFT APPLICATION.
Final rept., 11 Apr 66-10 Apr 67,
IIT Research Inst Chicago Ill
H. T. Betz. 10 Apr 67, 45p
Contract NOw-66-0439

Descriptors: (*Aircraft equipment, Periscopes), (*Periscopes, *Fiber optics), Feasibility studies, Stereoscopic display systems, Telescopes, Defects (Materials), Optical equipment components, Optical images, Space perception.

A program was conducted to investigate the feasibility of substituting a fiber optics periscope system for conventional direct viewing through the windshield in high performance aircraft operation. The requirements for a stereoscopic image presentation possessing time, distance, and spacial relationship are delineated. The stringent specifica-

tions imposed on dual fiber bundles by the stereoscopic application led to the successful development of a single-bundle telescope with flicker-free time sharing. A working model to demonstrate the single-bundle, time-shared system was constructed. Methods for providing display systems with long eye relief and large exit pupils are described. A working model incorporating a large spherical mirror was constructed for use with stereo slides to demonstrate these principles. (Author)
AD-651 060 HC$3.00 MF$0.65

WIND-TUNNEL INVESTIGATIONS OF A 1/20-SCALE POWERED MODEL OPEN-OCEAN V/STOL SEAPLANE.
David Taylor Model Basin Washington D C Aerodynamics Lab
For primary bibliographic entry see Field 20D.
AD-651 099 HC$3.00 MF$0.65

CONTRIBUTIONS TO THE DEVELOPMENT OF A POWER SPECTRAL GUST DESIGN PROCEDURE FOR CIVIL AIRCRAFT.
Technical rept.,
Lockheed-California Co Burbank
J. R. Fuller, L. D. Richmond, C. D. Larkins, and S. W. Russell. Jan 66, 326p
FAA-ADS-54
Contract FA-WA-4768
Prepared in cooperation with Boeing Co., Renton, Wash. See also AD-651 152.

Descriptors: (*Airframes, *Gust loads), Jet transport planes, Commercial planes, Loading (Mechanics), Load distribution, Atmosphere models, Flight, Aerodynamics, Equations of motion, Statistical analysis, Aeroelasticity, Probability, Power spectra, Design.
Identifiers: Boeing 720.

The report presents a dynamic gust analysis of the Boeing Model 720B airplane and outlines two procedures for assessing gust design strength for future civil transports. The procedures outlined are based on two approaches. The first is the design envelope approach, the second is the flight profile approach. The 720B airplane was studied for both concepts, first, by using the bending moment on the wing, fuselage, and vertical tail as indicies of their strengths. The second step was to study the more critical structural areas using a joint probability stress analysis approach developed by Boeing. The results of these analyses indicate that the design envelope and flight profile approaches give results that are in general agreement.
AD-651 131 HC$3.00 MF$0.65

A HELICOPTER STRUCTURAL FLIGHT LOADS RECORDING PROGRAM.
Technical rept.,
Technology Inc Dayton Ohio
F. Joseph Giessler, and Joseph F. Braun. Dec 66, 202p
FAA-ADS-89
Contract FA-65-WA-1329

Descriptors: (*Helicopters, Flight testing), Aerodynamic loading, Flight, Gust loads, Performance (Engineering), Tables, Motion, Acceleration, Transport planes.

A flight loads program was conducted on a Sikorsky S61N transport helicopter. The following parameters were measured: airspeed, altitude, longitudinal cyclic stick position, collective stick position, two engine torques, normal acceleration at c.g., yaw angular rate, pitch angular rate, and RPM. The rate of climb, thrust coefficient, and tip speed ratio were calculated from the measured parameters. The data were grouped into flight segments of takeoff and ascent, cruise, descent, flare and landing, and hover. The data were sorted by parameter ranges and are presented as bivariate and trivariate tables showing the time spent in each data range. Histograms present some of the more significant aspects of the data, and exceedance and probability curves depict the vertical load factor and the pitch and yaw rates. (Author)
AD-651 134 HC$3.00 MF$0.65

DEVELOPMENT OF A POWER SPECTRAL GUST DESIGN PROCEDURE FOR CIVIL AIRCRAFT.
Technical rept.,
Lockheed-California Co Burbank
Frederic M. Hoblit, Neil Paul, Jerry D. Shelton, and Francis E. Ashford. Jan 66, 489p
FAA-ADS-53
Contract FA-WA-4768
See also AD-651 131.

Descriptors: (*Airframes, *Gust loads), Transport planes, Commercial planes, Loading (Mechanics), Load distribution, Atmosphere models, Equations of motion, Mathematical models, Probability, Design, Mechanical properties, Wings, Fuselages, Tails (Aircraft), Jet transport planes, Power spectra.
Identifiers: Boeing 720, Constellation (Aircraft), Electra (Aircraft).

Three alternate forms of gust loads criterion based on power-spectral concepts are developed. These include a mission analysis criterion, a design envelope criterion, and a criterion combining advantages of each. The latter is recommended for design use. Design levels are determined based on the strength of three existing satisfactory airplanes, the Lockheed Model 749 (Constellation) and Model 188 (Electra) and the Boeing Model 720B. The determination of a design load level involves dynamic gust analysis of the three airplanes, taking into account the significant rigid body and elastic modes, for both vertical and lateral gust inputs, as well as detailed stress analysis to the resulting loads. Two techniques were developed for integrating the statistical determination of loads with the detailed stress analysis. One is the matching condition technique, in which design conditions are generated to closely envelope the statistically defined loads, with phase relations of the various load or stress components properly accounted for. The other is the joint probability technique, in which the joint probability density of axial and shear stresses is determined at all potentially critical locations in the structure and related to the respective strength envelopes. The sensitivity of results to variations in input data is investigated. (Author)
AD-651 152 HC$3.00 MF$0.65

PRELIMINARY DESIGN OF A ROTOR SYSTEM FOR A HOT CYCLE HEAVY-LIFT HELICOPTER.
Final rept., 17 Mar 65-31 Aug 66,
Hughes Tool Co Culver City Calif Aircraft Div
John R. Simpson. Mar 67, 389p Rept no. HTC-AD-66-17
USAAVLABS-TR-67-1
Contract DA-44-177-AMC-225 (T)

Descriptors: (*Helicopter rotors, Design), Lift, Helicopters, Rotor blades (Rotary wings), Stability, Configuration, Structural parts, Performance (Engineering).
Identifiers: Hot cycle propulsion systems.

In a preliminary design study of a rotor system for a Hot Cycle heavy-lift helicopter, the following items were accomplished. (1) An analytical procedure was developed that permitted calculation of fully coupled blade response and dynamic stability characteristics; (2) parametric and configuration studies involving basic characteristics of the rotor system were conducted; (3) design layouts, structural design studies, and detailed weight analyses were made (design and analysis were limited to the integrated lift-propulsion system with emphasis on the rotor system); (4) preliminary design was completed, and performance of the optimum rotor for the heavy-lift mission requirements was determined; (5) a fully coupled blade loads analysis of the optimum rotor was made; and (6) a full-scale mockup of the rotor hub area was constructed. (Author)
AD-651 217 HC$3.00 MF$0.65

ANALYSIS OF ARMY FIXED-WING CARGO RESTRAINT DESIGN CRITERIA.
Final rept.,
Aviation Safety Engineering and Research Phoenix Ariz
James P. Avery, and Stuart Larsen. Jan 67, 80p
Rept no. AvSER-66-21
USAAVLABS-TR-67-3
Contract DA-44-177-AMC-430 (T)

Descriptors: (*Transport planes, Cargo), (*Cargo, Supports), Aviation accidents, Landing impact, Computer programs, Army aircraft, Acceleration.
Identifiers: CV-2 aircraft, CV-7 aircraft.

The report presents the findings of an investigation into the crash pulse of fixed-wing cargo aircraft and the resulting behavior of cargo restrained by load limiters. A crash pulse simulator computer program was developed that obtains acceleration-time histories at selected stations in the cargo compartment and under various crash conditions. This simulator was employed to obtain crash pulses for a wide range of input parameters, both for the CV-2 and the CV-7 Army aircraft. The resulting acceleration pulses were studied to determine a suitable spectrum of realistic pulses. The crash pulse program was subsequently modified to include a routine that would simulate cargo dynamic behavior during the crash sequence, employing the floor acceleration data as it is developed. This latter program was applied to CV-2 and CV-7 aircraft, under significant crash conditions, to obtain the dynamic response of cargo to the crash pulse. (Author)
AD-651 219 HC$3.00 MF$0.65

PUMPING AND DRAG CHARACTERISTICS OF AN AIRCRAFT EJECTOR AT SUBSONIC AND SUPERSONIC SPEEDS.
National Advisory Committee for Aeronautics, Cleveland, Ohio. Lewis Flight Propulsion Lab.
For primary bibliographic entry see Field 21E.
NACA-RM-E54D06 HC$3.00 MF$0.65

MATCHING OF AUXILIARY INLETS TO SECONDARY-AIR REQUIREMENTS OF AIRCRAFT EJECTOR EXHAUST NOZZLES.
National Advisory Committee for Aeronautics, Cleveland, Ohio. Lewis Flight Propulsion Lab.
For primary bibliographic entry see Field 21E.
NACA-RM-E55D21 HC$3.00 MF$0.65

THE UNPOWERED, FREE FLIGHT, AIRCRAFT MODEL. DESIGN, OPERATION, AND INSTRUMENTATION FOR LOW SPEED STABILITY INVESTIGATIONS.
Royal Aircraft Establishment, Farnborough (England).
D. R. Dennis. Mar 63, 30p RAE-TN-AERO-2881

Descriptors: *Aircraft model, *Free flight, *Glide, *Low speed stability, Aircraft, Design, Distribution, Flight, Free, Inertia, Instrumentation, Low speed, Mass, Model, Operation, Pitch, Roll, Slender, Stability, Wing.

For abstract, see STAR 05 11.
N67-22714 HC$3.00 MF$0.65

TEMPERATURE LIMITATIONS OF POLYMERIC MATERIALS. PART 7 - TRANSPARENCIES.
Royal Aircraft Establishment, Farnborough (England).
G. Wood. Apr 64, 7p RAE-TN-CPM-53

Descriptors: *Aircraft construction, *Polymer, *Temperature effect, *Transparent material, Acrylic, Canopy, Effect, Glass, Interlayer, Limitation, Material, Organic, Plastic, Polyester, Siloxane, Temperature, Transparency, Vinyl, Window, Windshield.

For abstract, see STAR 05 11.
N67-22782 HC$3.00 MF$0.65

INVESTIGATION OF THE FREE-FLIGHT CHARACTERISTICS AND HANDLING QUALITIES OF A GROUND-EFFECT MACHINE.
National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
A. W. Carter, and L. H. Person, Jr.. Apr 67, 27p
NASA-TN-D-3885
Contract 721-01-00-08-23

Descriptors: *Free flight, *Ground effect machine, *Handling quality, Characteristics, Control, Effect, Flight, Free, Ground, Handling, Hovering, Machine, Quality, Stability, System, Yaw.

For abstract, see STAR 05 11.
N67-22864 HC$3.00 MF$0.65

A METHOD TO CORRECT THE CALIBRATION SHIFT OBSERVED IN A NIMBUS MEDIUM RESOLUTION INFRARED RADIOMETER ON THE NASA CONVAIR 990 AIRCRAFT.
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
For primary bibliographic entry see Field 20F.
For abstract, see STAR 05 11.
N67-22874 HC$3.00 MF$0.65

INVESTIGATION OF EFFECTS OF EXTREME STRUCTURAL FLEXIBILITY OF FLIGHT VEHICLES WITH FEEDBACK CONTROL SYSTEM STABILIZATION.
Eidgenossische Technische Hochschule, Zurich (Switzerland).
H. I. Flomenhoft. 1965, 142p
Its Dissertation No. 3600

Descriptors: *Feedback control system, *Flexibility, *Flight vehicle, *Stabilization, Aerodynamics, Body, Canard, Characteristics, Control, Dynamic, Feedback, Flight, Loading, Missile, Slender, Structural, Surface, System, Tail, Vehicle.

For abstract, see STAR 05 11.
N67-22941 HC$3.00 MF$0.65

EXPERIMENTAL VEHICLE PV-1 WITH AIR CUSHIONS. FLIGHT TEST (VEHICLE WITHOUT FLAPS).
Vehicule Experimental A Coussin D'air Pv-1. Essai en Vol (Vehicule Sans upe)
Brussels Univ. (Belgium). Institut D'aeronautique.
A. Jaumotte, A. Kiedrzynski, and M. Lejuene.
1966, 49p NT-10-1966, REPT.-3
in French

Descriptors: *Aerodynamic characteristics, *Flight test, *Research aircraft, Acceleration, Aerodynamic, Air, Aircraft, Characteristics, Cushion, Deceleration, Deviation, Flight, Gravity, Jet, Lift, Research, Test, Thrust.

For abstract, see STAR 05 11.
N67-22970 HC$3.00 MF$0.65

ANALYSIS OF THE DISTRIBUTION OF THE PRESSURE ON THE BASE OF AIR CUSHION VEHICLES IN SMOOTH FLOW.
Analyse de La Repartition de La Pression Sur La Base D'un Vehicule A Coussin D'air en Ecoulement Plan
Brussels Univ. (Belgium). Institut D'aeronautique.
G. Van Malder. Jun 66, 62p NT-9-1966
in French

Descriptors: *Pressure distribution, *Two-dimensional flow, Air, Airfoil, Altitude, Cushion, Deviation, Dimensional, Distribution, Experiment, Flight, Flow, Length, Pressure, Slot, Theory, Two.

For abstract, see STAR 05 11.
N67-22971 HC$3.00 MF$0.65

CORRELATION OF X-15 SIMULATION EXPERIENCE WITH FLIGHT TEST RESULTS.
Air Force Systems Command, Edwards AFB, Calif. Advanced Vehicles Research Branch.
R. G. Hoey. May 66, 24p AGARD-530
Presented At 28th Meeting of the Agard Flight Mech. Panel, Paris, 10-11 May 1966

Descriptors: *Aircraft performance, *Flight simulation, *X- 15 aircraft, Ablation, Aerodynamic, Aircraft, Envelope, Expansion, Flight, Handling, Heating, Performance, Pilot, Prediction, Simulation, Trajectory.

For abstract, see STAR 05 11.
N67-23247 HC$3.00 MF$0.65

CORROSION OF AIRCRAFT.
Advisory Group for Aerospace Research and Development, Paris (France).
H. G. Cole. Apr 66, 55p AGARD-540
Summaries and Discussions of Papers Presented At 22d Meeting of Agard Struct. and Mater. Panel, Delft, Netherlands, 19-20 Apr. 1966

Descriptors: *Aircraft maintenance, *Conference, *Corrosion prevention, Aircraft, Assessment, Corrosion, Damage, Design, inspection, Joint, Maintenance, Material, Metal, Prevention, Resistance, Service, Structure.

For abstract, see STAR 05 11.
N67-23248 HC$3.00 MF$0.65

ROUND-ROBIN COLD BRITTLENESS TESTS OF BALLOON FILMS.
Technical notes,
Hauser Research and Engineering Co., Boulder, Colo.
Ray L. Hauser. Mar 67, 30p
NCAR-TN-27
Research supported in part by NSF.

Descriptors: (*Balloons, *Tests), Balloon equipment, Films, Brittleness, Low-temperature research, Ductility, Tensile properties, Materials, Impact tests, Tables.

The report is one of a series prepared for the Materials Research Project of the NCAR Scientific Balloon Facility. The Project is one of several related efforts undertaken by the National Center for Atmospheric Research (NCAR) to increase the reliability, and to extend the capabilities, of scientific ballooning. The report covers a round-robin test program to compare various cold brittleness testing methods for balloon films. The purpose of this investigation was to compare alternate methods for cold brittleness test methods as applied to balloon film evaluation. Inclined plane and drop tests were performed by six participating companies on film samples from two manufacturers. The test results do not indicate any significant variability in cold brittleness properties of balloon films in terms of different machine or transverse locations. A quantitative measure of cold brittleness and ductility has been proposed. (Author)
PB-174 521 HC$3.00 MF$0.65

1D. AIRCRAFT FLIGHT CONTROL AND INSTRUMENTATION

COMPUTER/SIMULATION STUDY OF AIR-DERIVED SEPARATION ASSURANCE SYSTEMS IN MULTIPLE AIRCRAFT ENVIRONMENT.
Collins Radio Co Cedar Rapids Iowa
For primary bibliographic entry see Field 1B.
AD-650 821 HC$3.00 MF$0.65

CATEGORY III ALTITUDE MONITOR.
Final rept.,
Sierra Research Corp Buffalo N Y
Robert J. Theisen. Nov 65, 40p
FAA-RD-65-125
Contract FAA/BRD-230

Descriptors: (*Altimeters, Height finding), (*Marker lights, *Beacons), Navigational aids, Doppler effect, Airborne, Accuracy, Flight testing, Antenna radiation patterns, Computers, Monitors.

The report covers the additional work on the Altitude Monitor. The objectives called for (1) simultaneous altitude readout in both 9ground station and aircraft, (2) reduction of airborne equipment weight, (3) two equipment designs, one providing airborne and ground readout for commercial aircraft, the other ground readout (only for light aircraft, (4) higher accuracy of altitude readout, and (5) go/no-go airborne indication. Results were as follows: (1) ground readout was accomplished through the addition of an airborne FSR which returns the transmitted signal 30 mc from its original frequency, (2) airborne equipment weight was reduced to less than 5-1/2 lbs., (3) airborne equipment was miniaturized for light aircraft, (4) go/no-go airborne indication was designed into the airborne computer and flight-tested, and (5) the feasibility of precise inner marker capability was demonstrated. The two major problems were (1) doppler effect and (2) false airborne triggering, presumably due to ground radar interference. It was shown that the doppler effect is overcome by increasing the receiver bandwidth to 4 kc and that false airborne triggering is eliminated through raising the modulating frequency.
AD-650 917 HC$3.00 MF$0.65

FLUID STATE HYDRAULIC DAMPER.
Final rept., 1 Jul 65-24 Jun 66,
Honeywell Inc Minneapolis Minn Aeronautical Div
R. V. Burton, D. N. Carlson, R. L. Heinecke, and R. R. St. John. Feb 67, 157p Rept no. 15-003R
USAAVLABS-TR-66-87
Contract DA-44-177-AMC-294 (T)

Descriptors: (*Helicopters, *Flight control systems), (*Fluid amplifiers, Damping), Feasibility studies, Hydraulic systems, Yaw, Tests.

The report covers the developmental work accomplished on a program to demonstrate the feasibility of using fluidic sensing amplification and signal shaping techniques to mechanize a single-axis, rate feedback damper system for V/STOL aircraft. The specific design goal was to increase the yaw axis damping ratio of the UH-1B helicopter from 0.30 unaugmented to 0.60 augmented. The control problem was analyzed and the damper system mechanization defined through the use of analog and digital computer simulation techniques. The component hardware was designed, fabricated, and bench tested. Closed-loop system bench testing, using an analog computer to simulate the UH-1B helicopter, showed that the fluidic damper system was feasible for helicopter control system mechanization. The addition of the damper system to the simulated aircraft raised the yaw axis damping ratio from 0.30 unaugmented to 0.60 augmented. (Author)
AD-651 104 HC$3.00 MF$0.65

A PRELIMINARY THEORETICAL STUDY OF AN ADAPTIVE MANOEUVRE DEMAND AIRCRAFT CONTROL SYSTEM USING SAMPLED-DATA TECHNIQUES.

Royal Aircraft Establishment, Farnborough (England).
M. R. Watts. Dec 65, 31p RAE-TR-65278, AD-479403

Descriptors: *Adaptive control system, *Aircraft control, *Flight control, *Sampled data system, Adaptive, Aircraft, Analog, Computer, Control, Data, Digital, Flight, Gain, Pitch, Roll, Sample, Stability, System.

For abstract, see STAR 05 11.
N67-22704 HC$3.00 MF$0.65

CALIBRATION METHODS FOR THE ACCURATE ASSESSMENT OF THE STATIC AND DYNAMIC PERFORMANCE OF SOME FLIGHT TESTS INSTRUMENTS.
Aeronautical Research Council (Gt. Brit.)
I. Mc Laren. Sep 63, 47p ARC-CP-760, RAE-TN-AERO-2914

Descriptors: *Calibration, *Dynamic property, *Flight test instrument, *Static stability, Accuracy, Design, Dynamic, Element, Flight, Frequency, Instrument, Pendulum, Performance, Property, Response, Sensing, Shaking, Stability, Static, Table, Test, Turn.

For abstract, see STAR 05 11.
N67-22792 HC$3.00 MF$0.65

RECENT RESEARCH DIRECTED TOWARD THE PREDICTION OF LATERAL-DIRECTIONAL HANDLING QUALITIES.
National Aeronautics and Space Administration. Flight Research Center, Edwards, Calif.
K. W. Iliff, and L. W. Taylor, Jr.. May 66, 22p
NASA-TM-X-59621, AGARD-531
Presented At 28th Meeting of the Agard Flight Mech. Panel, Paris, 10-11 May 1966

Descriptors: *Handling quality, *Lateral control, *Pilot performance, Aircraft, Analog, Base, Control, Display, Fixed, Handling, Lateral, Parameter, Performance, Pilot, Prediction, Quality, Rating, Simulator, Technique.

For abstract, see STAR 05 11.
N67-23242 HC$3.00 MF$0.65

SOME OPEN-LOOP AND CLOSED-LOOP ASPECTS OF AIRPLANE LATERAL-DIRECTIONAL HANDLING QUALITIES.
Systems Technology, Inc., Hawthorne, Calif.
I. L. Ashkenas. May 66, 71p AGARD-533
Contract AF 33/657/-10407
Presented At 28th Meeting of the Agard Flight Mech. Panel, Paris, 10-11 May 1966

Descriptors: *Aircraft control, *Closed loop system, *Handling quality, *Lateral control, Aircraft, Closed, Conference, Control, Correlation, Handling, Lateral, Loop, Mathematics, Model, Open, Parameter, Pilot, Quality, Roll, System.

For abstract, see STAR 05 11.
N67-23244 HC$3.00 MF$0.65

FLIGHT EXPERIENCE OF RATE DEMAND CONTROL USING ELECTRIC SIGNALLING IN THE AVRO 707 C AIRCRAFT.
Royal Aircraft Establishment, Farnborough (England).
G. C. Howell. May 66, 24p AGARD-536
Presented At 28th Meeting of the Agard Flight Mech. Panel, Paris, 10-11 May 1966

Descriptors: *Avro 707 aircraft, *Electric control, *Flight test, *Pitch control, *Roll control, Conference, Control, Demand, Electric, Flight, Miniature, Optimization, Oscillation, Pilot, Pitch, Rate, Roll, Signal, System, Test.

For abstract, see STAR 05 11.
N67-23246 HC$3.00 MF$0.65

1E. AIR FACILITIES

ELAPSED TIME AS A MEASURE OF NAS TERMINAL PERFORMANCE FEASIBILITY STUDY PHILADELPHIA - RICHMOND.
Interim rept.,
Federal Aviation Agency Washington D C Systems Research and Development Service
Donald L. Dunlap, and Stanley H. Gaffen. Dec 65, 58p Rept no. FAA-RD-65-138

Descriptors: (*Air traffic control terminal areas, Operation), Effectiveness, Airports, Time, Feasibility studies, Sampling, Quality control, Airports, Monitors, Costs, Take-off, Landings.

This study investigates the feasibility of quantifying terminal area delay from the measurement of departure and arrival elapsed times. Elapsed time data were obtained on all fixed wing itinerant flights occurring at Philadelphia International Airport, Philadelphia, Pa., and Byrd Field, Richmond, Va., during a 10 day period in May. The report describes the behavior of the elapsed time data obtained, discusses the use of elapsed time data as a measure of NAS terminal performance, and makes some recommendations regarding the initiation of a national terminal performance measurement system.
AD-650 839 HC$3.00 MF$0.65

ANALYSIS OF CRITERIA FOR PAVEMENT SLOPES.
Final rept.,
Midwest Research Inst Kansas City Mo 26
Frank Turner. May 65, 78p
FAA-RD-65-53
Contract FAA-ARDS-569

Descriptors: (*Runways, Configuration), Geometry, Analysis, Pavements, Performance (Engineering), Aircraft, Effectiveness, Design.

An analysis was made of existing and future airport surface requirements to develop valid design criteria for the gradient parameters of runways, taxiways and aprons. A study which has included aircraft performance requirements, airport operation history and pilots' comments led to the following recommendations. (1) The effective gradient should be redefined to include the effect of runway grade on different segments of ground operation. The new effective gradient should be calculated by the following relationships: For take-off (G sub e)sub TO = G sub 1 + G sub 2 + 2 G sub 3 + 4 G sub 4/8 and for accelerate-stop (G sub e)sub AS = G sub 1 + G sub 2 - G sub 3 - G sub 4/4 where G sub 1, G sub 2, G sub 3 and G sub 4 are equal to the average gradient of the first, second, third and fourth quarter of the runway, respectively. In general, take-off performance is critical on uphill or 'cup shaped' runways and accelerate-stop is critical on downhill or 'humped' runways. (2) The take-off runway length correction should be calculated for each operational aircraft. (3) No change is recommended in the existing maximum effective gradient (1 per cent) or the existing maximum longitudinal gradient (1-1/2 per cent) for runways or taxiways. (4) No change is recommended in the criteria governing the length of vertical curves, the distance between points of intersection of vertical curves, the line-of-sight criteria, or the transverse grade. (5) The maximum slopes on aprons should be increased to 1-1/2 per cent. No change is recommended in fueling-area slopes. (Author)
AD-650 842 HC$3.00 MF$0.65

EVALUATION OF RUNWAY LIGHTING SYSTEMS FOR EFFECTIVENESS IN DENSE FOG.
California Univ Berkeley Inst of Transportation and Traffic Engineering
For primary bibliographic entry see Field 17G.
AD-650 864 HC$3.00 MF$0.65

DATA TRANSFER EXPERIMENTATION FOR CONUS.
Interim rept.,
National Aviation Facilities Experimental Center Atlantic City N J
William F. Sullivan. Dec 65, 52p
FAA-RD-65-110

Descriptors: (*Air traffic controllers, Communication systems), (*Air traffic control systems, Digital computers), Simulation, Input-output devices, Data storage systems, Pilots, Voice communication systems, Very high frequency, Ultrahigh frequency.

Tests were conducted at the National Aviation Facilities Experimental Center using the Model A traffic control simulator to explore the use of digital high speed communications in the air traffic control environment. Simulated input and output devices were provided for use by the controllers working at an en route position so that the controllers were able to select, compose, and transmit traffic control messages to the simulator pilots by other than the usual voice methods. The results indicated that there are eight major categories of messages that are suitable for ground-to-air transmission using digital methods in lieu of voice. Three of these categories (altitude, frequency, and heading change instructions) require quick-action input keys for the controller and should be displayed to the pilot on a miniature 4-digit indicator in the cockpit. Such control instructions require priority handling and therefore need instantaneous pilot acknowledgement by voice. The other five categories involve clear text messages that should be displayed to the pilot on a cockpit printer. They are selected from computer storage and have a lower priority than the altitude and heading change instructions. Some input devices for text messages need to be tailored to match the airways structure of various en route sectors in which they are used. It is important that a direct and convenient method of selecting the address of aircraft be provided.
AD-650 902 HC$3.00 MF$0.65

DEVELOPMENT OF A PAVEMENT HEATING SYSTEM TO REMOVE SNOW FROM AIRPORT RUNWAY INSET LIGHTS.
Final rept.,
Melpar Inc Falls Church Va
J. S. Pentecost, J. E. Riley, A. F. Saphonchak, and D. H. Rice. Dec 65, 145p
FAA-RD-65-109
Contract FA-64-WA-5183

Descriptors: (*Pavements, Heating), (*Runways, *Snow removal), (*Landing lights, Airports), Lighting equipment, Roads, Wind, Velocity, All-weather aviation, Costs, Performance (Engineering), Concrete, Asphalt, Storms, Meteorology, Marker lights, Heaters.

The heating requirements for snow melting were found to vary widely with meteorological conditions. A satisfactory method of determining heating requirements for a location is presented; this method is based on the ASHRAE Guide and Data Book. For airport use, a system adequate for 98% of the snowfall hours was selected for snow removal in front of inset lights. Some minor snow accumulation may occur during severe storms, but such severe conditions would limit runway use for reasons other than snow accumulation during this time period. Electrical heaters and a simple heat pump were installed at NAFEC for evaluation. The heat pump consisted of an inverted L-shaped sealed pipe which contained liquid ammonia, in the vertical leg. It was found that simple hairpin, or W-shaped, electrical heater patterns operated

at 25 to 50 watts per lineal foot at a depth of 1 inch were satisfactory for both asphalt and concrete surfaces. The heat-pump design, as used, was not adequate for the performance desired; however, a redesign should increase its heating capacity. The cost for installing an electrical heater, the necessary supply wiring, and the transformers was estimated at about $200 each for a typical all-weather runway. For a heat pump of adequate design, costs of $200 to $300 each are estimated on the same basis. Hydronic heating systems were studied, but discarded as excessively expensive. Further evaluation of the problems of wind- or jet-blown snow and its accumulation over the heated area were recommended.
AD-650 907 HC$3.00 MF$0.65

GUIDE-LITE HELIPORT SYSTEM.
Final rept.,
Burroughs Corp Paoli Pa Control Instrument Div
Eugene T. Hain. Dec 65, 43p
FAA-RD-65-57
Contract FA-WA-4534

Descriptors: (*Heliports, *Air traffic control systems), (*Approach indicators, Guidance), Helicopters, Landings, Approach lights, Landing aids, Landing lights, Lighting equipment, Control panels.

A detailed description is given of the design and construction of a ground-based visual landing aid for helicopters. The purpose of the device is to identify the landing site and indicate the proper landing path and approach velocity. The unit is operational and will be flight tested and evaluated by the FAA.
AD-650 910 HC$3.00 MF$0.65

DEVELOPMENT OF A LOW COST SECONDARY AIRPORT LIGHTING SYSTEM.
Final rept.,
Bergen Research Engineering Corp Teterboro NJ
R. G. Ross. Sep 65, 28p
FAA-RD-65-26
Contract FA-WA-4615

Descriptors: (*Lighting equipment, *Airports), Costs, Night landings, Incandescent lamps, Fluorescence, Landing lights, Runways, Indicator lights, Visibility, Wind, Meteorological instruments.

Low capital cost of a lighting system for VFR night operations at secondary airfields can be achieved using a three-fold design approach. This design approach employs pulsed incadescent lamps in place of xenon flash tubes, and substitutes fluorescent lights for steady burning incandescent sources when feasible. In addition, it sizes wind indicators to the legibility needs of typical secondary airport operations. The major components of the lighting system described include runway edge lights, steady burning approach and threshold lights, wind tee, rotating beacon, glide slope indicator, and obstruction lights. A field test of the prototype is recommended to evaluate the operational usefulness of the low cost lighting. Also recommended, is the initiation of a new wind indicator design, based on the minimum resolution of wind speed and direction needed for secondary airport operations. (Author)
AD-650 919 HC$3.00 MF$0.65

SOME OPERATIONAL CHARACTERISTICS OF IN-PAVEMENT LIGHTING FIXTURES.
Interim rept.,
National Aviation Facilities Experimental Center
Atlantic City N J
Cecil B. Phillips. Nov 65, 38p
FAA-RD-65-133

Descriptors: (*Lighting equipment, Pavements), (*All-weather aviation, Airports), Maintenance, Runways, Traffic, Operation, Intensity, Reduction, Energy conversion, Damage.

The report contains the results of technical tests performed on several types of in-pavement lighting fixtures to determine their operational characteristics. This testing was conducted in the laboratory, on a special test pad or with operational field installations. Test procedures can be developed from these results that will insure the quality of the production fixtures to remain equal to the sample units that were used for the approval testing.
AD-650 962 HC$3.00 MF$0.65

DALLAS/FT. WORTH REGIONAL AIRPORT SIMULATION STUDY.
National Aviation Facilities Experimental Center
Atlantic City N J
For primary bibliographic entry see Field 17G.
AD-651 158 HC$3.00 MF$0.65

2. AGRICULTURE

2A. AGRICULTURAL CHEMISTRY

FODDER CONSERVATION RESEARCH IN CSIRO 1954-1964.
Commonwealth Scientific and Industrial Research Organization, Melbourne (Australia).
For primary bibliographic entry see Field 2D.
PB-174 458 HC$3.00 MF$0.65

2D. AGRONOMY AND HORTICULTURE

FODDER CONSERVATION RESEARCH IN CSIRO 1954-1964.
Commonwealth Scientific and Industrial Research Organization, Melbourne (Australia).
G. W. Lanigan. 10 Aug 65, 31p

Descriptors: (*Research program administration, *Grasses), (*Drying, Grasses), Plants (Botany), Agriculture, Aging (Materials), Chemical analysis, Nitrogen, Straw, Atmospheric temperature, Moisture.

The Fodder Conservation Section, CSIRO, was established in 1958. The immediate availability of trained staff enabled fodder conservation studies to be undertaken on a broad front. In recent years, the research was devoted to an intensive investigation of forage plant chemistry, pathways and mechanisms of moisture movement during hay curing, post-harvest physiology of pasture species, and the biochemistry and microbiology of ensilage. The results were of value to agricultural scientists responsible for advisory and extension work in fodder conservation, and for several years the Section maintained close contact with State Departments of Agriculture, particularly with the Victorian Department. This close association was also valuable to the Section in that its scientists were kept acquainted with the multitude of problems encountered in the field and were able to orientate their investigations accordingly. During the latter half of 1964, investigations by the Fodder Conservation Section were concluded. It thus seemed appropriate to prepare an outline account and bibliography of the work conducted by the Section. (Author)
PB-174 458 HC$3.00 MF$0.65

2F. FORESTRY

ANNOTATED BIBLIOGRAPHY OF WALNUT AND RELATED SPECIES.
Research paper,
North Central Forest Experiment Station, St. Paul, Minn.
David T. Funk. Dec 66, 52p RP-NC-9

Descriptors: (*Trees, *Bibliographies), Ecology, Plants (Botany), Forestry, Wood, Reports, Subject indexing.

Includes 627 items constituting virtually all the technical literature dealing with the ecology, silviculture, and timber products of Juglans. Material is arranged in alphabetical order by author. An index lists the items by subject matter. (Author)
PB-174 509 HC$3.00 MF$0.65

PROMISING CONIFERS FOR WESTERN IOWA.
Research paper,
North Central Forest Experiment Station, St. Paul, Minn.
Gayne G. Erdmann. Dec 66, 12p RP-NC-8

Descriptors: (*Forestry, Trees), Plants (Botany), Climatology, Soils, Carbonates, Seeds, Genetics, Mathematical prediction, Mortality rates, Iowa.

Eleven out of 24 conifer species planted in western Iowa appear to be adapted to local conditions. Success increases with increase in depth to free carbonates in soil. (Author)
PB-174 510 HC$3.00 MF$0.65

PULPWOOD PRODUCTION IN THE NORTHEAST 1964.
Resource bull.,
Northeastern Forest Experiment Station, Upper Darby, Pa.
Neal P. Kingsley. 1967, 30p RB-NE-5
Availability: Original document in color until exhausted. See also PB-174 588.

Descriptors: (*Wood pulp, Production), Wood, Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, West Virginia, Industries, Economics, Data, Trees.

The second in an annual series of reports on pulpwood production in the 12 Northeastern States, containing data by counties for round pulpwood production and data by states for wood-chip and other wood-industry byproducts. Compares 1963 and 1964 production. Also contains data on total receipts from outside the 12-state region. (Author)
PB-174 585 HC$3.00 MF$0.65

A LOOK AT BLACK WALNUT TIMBER RESOURCES AND INDUSTRIES.
Resource bull.,
Northeastern Forest Experiment Station, Upper Darby, Pa.
Kenneth L. Quigley, and Ronald D. Lindmark. 1967, 34p RB-NE-4

Descriptors: (*Wood, *Forestry), Industries, Natural resources, Economics, Trees.

Shows that current annual cut of all grades of walnut timber is slightly less than the growth accruing annually on commercial forest land. However, the annual cut of high-quality material exceeds the annual growth by almost 50 percent. The outlook for high-quality walnut timber in sufficient quantity to supply the current and increasing demand is not promising. Both growth and cut in future years must inevitably be lower until new management efforts begin to show results. (Author)
PB-174 586 HC$3.00 MF$0.65

DEER BROWSING IN NORTHERN HARDWOODS AFTER CLEARCUTTING. EFFECT ON HEIGHT, DENSITY, AND STOCKING OF REGENERATION OF COMMERCIAL SPECIES.

Research paper,
Northeastern Forest Experiment Station, Upper Darby, Pa.
James S. Jordan. 1967, 18p RP-NE-57

Descriptors: (*Trees, Growth), Animals, Food, Forestry, Damage.

Heavy deer browsing in clearcut northern hardwood stands can seriously reduce the height and density of commercial reproduction. These effects appear to be greatest in stems in the 3- to 5-foot height range. Where browsing is heavy, the density and stocking rates of stems above 3 feet in height may be a better indicator of the progress of stand establishment than if stems under 3 feet are included. The taller stems also appear to be a better indicator of the capability of stands to regenerate themselves. (Author)
PB-174 587 HC$3.00 MF$0.65

PULPWOOD PRODUCTION IN THE NORTHEAST 1963.
Resource bull.,
Northeastern Forest Experiment Station, Upper Darby, Pa.
Neal P. Kingsley. 1966, 30p RB-NE-3
Availability: Original document in color until exhausted. See also PB-174 585.

Descriptors: (*Wood pulp, Production), Wood, Production, Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, West Virginia, Industries, Economics, Data.

This first in a series of annual publications contains data on the production of round pulpwood by counties in the 12 Northeastern States and the production of pulpwood chips and miscellaneous wood-industry byproducts used in the manufacture of woodpulp in each of the 12 states. Also data that show the trend in woodpulp consumption in the Northeast from 1955 through 1963. The methods used in gathering the data are explained. (Author)
PB-174 588 HC$3.00 MF$0.65

THE MARKET FOR FIREPLACE WOOD IN AN URBAN AREA OF CONNECTICUT.
Northeastern Forest Experiment Station, Upper Darby, Pa.
For primary bibliographic entry see Field 11L.
PB-174 589 HC$3.00 MF$0.65

STUMP SPROUTING OF FOUR NORTHERN HARDWOODS.
Research paper,
Northeastern Forest Experiment Station, Upper Darby, Pa.
Dale S. Solomon, and Barton M. Blum. 1967, 16p RP-NE-59

Descriptors: (*Trees, Growth), Statistical analysis, Animals, Food.

To aid timber and wildlife managers, relationships between stump sprouting and characteristics of the stump and surrounding stand were investigated for red maple, sugar maple, paper birch, and yellow birch. Prediction equations indicated that small stumps of red maple (the most prolific sprouter) and sugar maple generally produced more sprouts than larger stumps. The smaller sugar maple stumps and younger red maple stumps produced taller sprouts. Relationships for paper birch were inconclusive; and yellow birch proved to be essentially a non-sprouting species. (Author)
PB-174 590 HC$3.00 MF$0.65

GERMINATION AND GROWTH OF PAPER BIRCH AND YELLOW BIRCH IN SIMULATED STRIP CUTTINGS.
Research paper,
Northeastern Forest Experiment Station, Upper Darby, Pa.
David A. Marquis. 1966, 22p RP-NE-54

Descriptors: (*Trees, Growth), Germination, Forestry, Moisture, Temperature, Light.

Germination, survival, and growth of paper birch and yellow birch were studied under saran cloth shade screens that simulated various types of forest openings. Best conditions were found under screens that represented very narrow east-west and north-south strip cuttings. Full sunlight produced lowest germination and survival. (Author)
PB-174 591 HC$3.00 MF$0.65

TREE PLANTING IN SCRUB OAK AREAS AFTER SITE PREPARATION WITH HEAVY EQUIPMENT.
Research paper,
Northeastern Forest Experiment Station, Upper Darby, Pa.
William E. McQuilkin, and Eugene F. McNamara. 1967, 32p RP-NE-60

Descriptors: (*Forestry, Growth), Trees, Preparation, Soils, Costs.

A rootrake technique for preparing sites for planting in rough, stony brushlands is described. By this technique separate patches, each 10 by 15 to 20 feet, are cleared in lines 10 feet apart. At 1956 rental rates for equipment, the cost for such site preparation was about $18 per acre, and the total cost for preparation, trees, and planting labor was about $44 per acre. Trees planted in sites thus prepared in the scrub oak type of the Pennsylvania Poconos have grown well without subsequent release treatments. Red pine and Japanese larch are the most highly recommended species. (Author)
PB-174 593 HC$3.00 MF$0.65

3. ASTRONOMY AND ASTROPHYSICS

3A. ASTRONOMY

COSMIC RAY EXPOSURE AGES OF IRON METEORITES BY THE Ne21/Al26 METHOD.
Revised ed.,
Chicago Univ Ill Enrico Fermi Inst for Nuclear Studies
Michael E. Lipschutz, Peter Signer, and Edward Anders. 15 Dec 64, 18p
Contract Nonr-710 (58)
Revision of manuscript submitted 26 Aug 63. Prepared in cooperation with Minnesota Univ., Minn. School of Physics and Astronomy.
Availability: Published in Journal of Geophysical Research v70 n6 p1473-89 Mar 15 1965.

Descriptors: (*Iron, *Meteorites), (*Cosmic rays, Meteorites), Radiation chemistry, Nuclear radiation spectrometers, Detectors, Diagrams, Magnetic properties, Helium group gases, Mass spectroscopy, Measurement.

The Al26 and Ti44 contents of 10 iron meteorites were determined by gamma-gamma coincidence counting of separated fractions. The Al26 contents, ranging from 0 to 2.70 dpm/kg, were lower by factors of 1.5 to 3 than literature values obtained by beta-counting. This discrepancy is apparently caused by a beta-emitting impurity that interferes in beta-counting but not in the gamma-gamma coincidence method. The concentrations of He3, He4, Ne21, Ar36, and Ar38 were determined mass spectrometrically. From the Ne21 and Al26 content of these meteorites, the following cosmic ray exposure ages, in millions of years, were calculated. The absence of Ti44 activity in Norfolk shows that it cannot have been associated with a 1907 fireball, as had been previously supposed. Sandia Mountains appears to have a low Al26 activity, possibly due to a terrestrial age of the order of 1,000,000 years. (Author)
AD-650 655 Not available from CFSTI.

CLASSIFICATION OF SOLAR PROMINENCES FOR SUNSPOT CYCLE NO. 19 - 1964,
Harvard Coll Observatory Cambridge Mass Solar Dept
For primary bibliographic entry see Field 3B.
AD-651 132 HC$3.00 MF$0.65

BALLOON SOLAR OBSERVATORY SYSTEM.
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
P. Fahlstrom. Apr 66, 98p NASA-TM-X-55711, X-732-66-147

Descriptors: *Balloon, *Solar observatory, Computer, Control, Design, Mechanical, Method, Observatory, Point, Sensor, Solar, Structure, System, Telemetry, Testing.

For abstract, see STAR 05 11.
N67-22073 HC$3.00 MF$0.65

COMMUNICATIONS OF THE LUNAR AND PLANETARY LABORATORY, VOLUME 5, PART 3, NO. 72-78.
Arizona Univ., Tucson.
G. P. Kuiper. 1966, 127p
Contract AF 19/628/-4332

Descriptors: *Coordinate system, *Lunar photography, *Selenography, Constant, Coordinate, Focus, Least, Length, Lunar, Measurement, Method, Photography, Position, Reduction, Rotation, Scale, Square, Star, System, Telescope, Trail, Transfer, Triangulation.

For abstract, see STAR 05 11.
N67-22511 HC$3.00 MF$0.65

FEASIBILITY STUDY OF A METEOROID COMPOSITION ANALYZER SPECTROGRAPHIC SYSTEM FINAL REPORT.
Avco Corp., Wilmington, Mass. Research and Technology Labs.
For primary bibliographic entry see Field 20F.
For abstract, see STAR 05 11.
N67-23325 HC$3.00 MF$0.65

ANNUAL REPORT, 1965.
European Southern Observatory, Hamburg (West Germany).
1966, 31p

Descriptors: *Astronomical observatory, Astrography, Astronomical, Chile, Observatory, Photometry, Prism, Progress, Report, Spectrography, Telescope.

For abstract, see STAR 05 11.
N67-23384 HC$3.00 MF$0.65

3B. ASTROPHYSICS

A COMPILATION OF RADIO SOURCE FLUX DENSITIES,
California Inst. of Tech., Pasadena. Owens Valley Radio Observatory.
Kenneth I. Kellermann. 1964, 34p
Publications of the Owens Valley Radio Observatory, vl nl.

Descriptors: (*Extraterrestrial radio waves, Astronomical data), Sources, Radio astronomy, Interferometers, Radiofrequency spectroscopy, Tables.

The flux densities which were used to determine the spectra of 242 galactic and extragalactic radio

sources are tabulated. They are taken from a set of interferometer observations made at 475, 710, 958, 1420, and 2841 Mc/s, and from the published results of other observations.
AD-442 603 HC$3.00

SMALL HYDROMAGNETIC OSCILLATIONS OF A TWO-DIMENSIONAL CAVITY,
Queen Mary Coll London (England)
For primary bibliographic entry see Field 20I.
AD-650 618 HC$3.00 MF$0.65

OBSERVATIONS OF THE RADIO SOURCE CTA 102,
Arecibo Ionospheric Observatory Puerto Rico
Yervant Terzian. Jul 66, 3p
AFOSR-67-0801
Contract AF 49 (638)-1156
Abstracts presented at the Meeting of the American Astronomical Society (122nd), 24-28 Jul 1966, Ithaca, N. Y.
Availability: Published in The Astronomical Journal v71 n9 Nov 1966.

Descriptors: (*Extraterrestrial radio waves, Sources), Radio astronomy, Very high frequency, Ultrahigh frequency, Intensity, Scanning.
Identifiers: CTA 102.

In November 1965 a regular observing program was started in order to follow the variability of CTA 102 as reported by Sholomitskii. The Arecibo Ionospheric Observatory's 1000-ft dish was used for all the observations. All the observations covered a period of eight months. Three radio sources, 3C435, CTA 102, and 3C14, were observed and their intensities were compared with each other. The results show that there is no variation greater than 8% for CTA 102 at the observed frequencies. (Author)
AD-650 670 Not available from CFSTI.

GENERAL RELATIVITY AND ITS EFFECTS ON PLANETARY ORBITS AND INTERPLANETARY OBSERVATIONS.
Technical rept.,
Massachusetts Inst of Tech Lexington Lincoln Lab
M. J. Tausner. 7 Oct 66, 62p Rept no. TR-425
ESD-TR-66-444
Contract AF 19 (628)-5167

Descriptors: (*Relativity theory, Experimental data), (*Radio astronomy, Relativity theory), Planets, Orbital trajectories, Celestial mechanics, Equations of motion, Electromagnetic waves, Radar signals, Propagation, Doppler effect, Gravity, Light, Earth (Planet), Moon, Solar systems.

A discussion is presented of all aspects of the General Relativity Theory that can be tested at present or in the near future by performance of interplanetary radar experiments. The assumptions underlying general relativity and the mathematical concepts and techniques used are first introduced. Then the approximate equations of motion, to the accuracy needed for the solar system, are derived. Finally, the propagation of electromagnetic waves according to general relativity is considered, and expressions for the time delays and Doppler shifts are obtained. (Author)
AD-650 730 HC$3.00 MF$0.65

BROADENING OF ISOLATED LINES IN THE IMPACT APPROXIMATION USING A DENSITY MATRIX FORMULATION,
Colorado Univ Boulder
J. Cooper. Jan 67, 14p
AROD-4445:74
Contract DA-31-124-ARO (D)-139, ARPA Order-0492
Availability: Published in Reviews of Modern Physics v39 n1 p167-77 Jan 1967.

Descriptors: (*Line spectrum, Approximation (Mathematics)), Wave functions, Difference equations, Integral transforms, Photons, Atoms, Errors, Hamiltonian, Interactions, Electric fields, Quantum mechanics, Statistical functions, Impact, Probability.

In recent years the theory of line broadening has been considerably advanced through the generalized impact approximation, which has as its starting point an expression for the quantum-mechanical autocorrelation function. In this paper the results for isolated lines in the impact approximation are rederived using a density matrix formulation. The method presented here is not particularly rigorous; however, it assists in the understanding of the approximations made in the autocorrelation function approach, and in some cases possible methods of extending the theory become much more apparent. For example, in this formulation, the broadening of an electric quadrupole transition is obvious.
AD-650 737 Not available from CFSTI.

FURTHER OBSERVATIONS OF PLANETARY NEBULAE AT 10 CM WAVELENGTH, INCLUDING THE PECULIAR NEBULA NGC 6302,
California Inst of Tech Pasadena Owens Valley Radio Observatory
A. R. Thompson, and R. S. Colvin. 1967, 7p Rept no. 4
Contract N00014-67-A-0094-0008
Availability: Published in Astrophysical Journal.

Descriptors: (*Nebulae, *Extraterrestrial radio waves), Radiofrequency spectroscopy, Microwave frequency, Emissivity, X rays, Sources.

Flux densities of 32 planetary nebulae additional to those observed by Thompson, Colvin and Stanley are given for a wavelength of 10 cm. The peculiar nebula NGC 6302 is included, and appears to have a thermal spectrum. (Author)
AD-651 014 Not available from CFSTI.

A DISTANCE LIMIT FOR THE QUASI-STELLAR OBJECT 3C 147,
California Inst of Tech Pasadena Owens Valley Radio Observatory
W. L. H. Shuter, H. C. Polley, and D. H. Rogstad. 1967, 6p Rept no. 5
Contract N00014-67-A-0094-0008
Prepared in cooperation with British Columbia Univ., Vancouver.
Availability: Published in Astrophysical Journal.

Descriptors: (*Extraterrestrial radio waves, Sources), Galaxies, Radiofrequency spectroscopy, Emissivity, Doppler effect, Absorption spectrum.
Identifiers: Quasi-stellar radio sources.

Since current theories suggest that the observed redshifts of quasi-stellar objects (QSO's) may not be a reliable indication of their distance, it has appeared desirable to investigate experimentally other methods of estimating or setting limits to their distances. The experiment described here used the spiral arms of the galaxy as distance indicators. (Author)
AD-651 029 Not available from CFSTI.

SYMPOSIUM ON INTERDISCIPLINARY ASPECTS OF RADIATIVE ENERGY TRANSFER.
General Electric Co Philadelphia Pa Missile and Space Div
For primary bibliographic entry see Field 20F.
AD-651 048 HC$3.00 MF$0.65

TABLE OF HARTREE-FOCK SELF CONSISTENT FIELD WAVE FUNCTIONS WITH EXCHANGE. SUPPLEMENT III,
Aerospace Research Labs Wright-Patterson AFB Ohio
T. K. Krueger, W. L. McDavid, and S. J. Czyzak. Jan 67, 323p Rept no. ARL-67-0014
See also AD-614 428, AD-631 938.

Descriptors: (*Wave functions, Tables), (*Atomic energy levels, *Hartree-Fock approximation), Atomic spectroscopy, Astrophysics, Line spectrum, Electron transitions, Atoms, Ions, Atomic orbitals.

A table is presented of the Hartree-Fock wave functions for various atoms and ions mainly of astrophysical interest having atomic numbers ranging from 3 to 80. Also included in the table are the one-electron energy parameters and the relativistic and spin-orbit energy corrections. (Author)
AD-651 072 HC$3.00 MF$0.65

CLASSIFICATION OF SOLAR PROMINENCES FOR SUNSPOT CYCLE NO. 19 - 1964,
Harvard Coll Observatory Cambridge Mass Solar Dept
Donald H. Menzel, and F. Shirley Jones. Dec 66, 95p Rept no. Scientific-12
AFCRL-67-0035
Contract AF 19 (628)-3322
See also AD-629 956.

Descriptors: (*Solar disturbances, *Classification), (*Sunspots, *Astronomical data), Astronomical observatories, Analysis, Sun, Tables, Intensity, New Mexico.
Identifiers: Solar prominences.

The report contains a tabulation and analysis of the behavior classification of prominences observed during 1964 at the Sacramento Peak Observatory, Sunspot, New Mexico. (Author)
AD-651 132 HC$3.00 MF$0.65

ANALYTICAL PERTURBATION THEORY IN RELATION TO THE THREE BODIES PROBLEM APPLYING THE REGULATING VARIABLES.
Analytische Stoerungstheorie Im Dreikoerper-Problem Mit Hilfe Von Regularisierenden Variablen
Eidgenossische Technische Hochschule, Zurich (Switzerland).
M. Roessler. 1966, 69p REPT.-3772
in German

Descriptors: *Celestial mechanics, *Perturbation theory, *Three-body problem, Body, Celestial, Convergence, Differential, Eccentricity, Equation, Fourier series, Mechanics, Motion, Perturbation, Problem, Regulation, Smoothing, Theory, Three, Trajectory, Variable.

For abstract, see STAR 05 11.
N67-22100 HC$3.00 MF$0.65

STUDY IN COMETARY ASTROPHYSICS QUARTERLY REPORT, NOV. 20, 1966 - FEB. 20, 1967.
Melpar, Inc., Falls Church, Va.
10 Mar 67, 31p NASA-CR-83398
Contract NASW-1417

Descriptors: *Carbon, *Comet, *Electron bombardment, *Emission spectrum, Acetylene, Bombardment, Collision, Decomposition, Doublet, Electron, Emission, Ethane, Gas, Hydrogen, Low pressure, Methane, Molecule, Spectrum, Triplet.

For abstract, see STAR 05 11.
N67-22260 HC$3.00 MF$0.65

INTENSITY VARIATIONS OF H ALPHA AND N II 6 583 A LINES IN THE NIGHT SKY SPECTRUM.
Volt Technical Corp., Washington, D. C.
For primary bibliographic entry see Field 4A.
For abstract, see STAR 05 11.
N67-22287 HC$3.00 MF$0.65

SEPARATION OF MATTER AND ANTIMATTER.
Royal Inst. of Tech., Stockholm (Sweden). Electron and Plasma Physics Div.
H. Alfven. Dec 66, 18p REPT.-66-18

Descriptors: *Antimatter, *Extraterrestrial matter, *Plasma decay, Antiparticle, Decay, Electric, Electrolysis, Electron, Extraterrestrial, Field, Line, Magnetic, Matter, Metagalaxy, Model, Plasma, Pressure, Process, Proton, Radiation, Separation.

For abstract, see STAR 05 11.
N67-22498 HC$3.00 MF$0.65

A PROGRAM OF HIGH ANGULAR RESOLUTION STUDIES OF CELESTIAL X-RAY SOURCES.
American Science and Engineering, Inc., Cambridge, Mass.
R. Giacconi, P. Gorenstein, H. Gursky, H. Manko, and J. R. Waters. Apr 67, 38p NASA-CR-752
Contract NASW-1505

Descriptors: *Aerobee rocket, *Cygnus constellation, *Stellar radiation, *X-ray astronomy, Astronomy, Photograph, Star, X-ray.

For abstract, see STAR 05 11.
N67-22780 HC$3.00 MF$0.65

LUNAR OCCULTATION OF 3 C 132.
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
L. W. Brown. Apr 67, 11p NASA-TM-X-55745, X-615-67-165

Descriptors: *Lunar occultation, *Radio source, Astrophysics, Diameter, Galaxy, Identification, Lunar, Occultation, Optical, Position, Radio, Red, Source.

For abstract, see STAR 05 11.
N67-22873 HC$3.00 MF$0.65

OBSERVATIONS OF NUCLEI HEAVIER THAN IRON IN THE PRIMARY COSMIC RADIATION.
Minnesota Univ., Minneapolis. School of Physics and Astronomy.
For primary bibliographic entry see Field 20H.
For abstract, see STAR 05 11.
N67-22876 HC$3.00 MF$0.65

ANNUAL REPORT 1965-1966.
Council for Scientific and Industrial Research, Pretoria (South Africa). National Inst. for Telecommunications Research.
1966, 16p CSIR-TEL-60

Descriptors: *Radio astronomy, *Radio wave, *Wave propagation, Astronomy, Deep space instrumentation facility (dsif), Distance, Equipment, Ionosphere, Level, Measurement, Noise, Position, Precipitation, Propagation, Radio, Satellite tracking and data acquisition network, Sounding, Space, Station, Wave.

For abstract, see STAR 05 11.
N67-22950 HC$3.00 MF$0.65

THE TRANSFER OF MECHANICAL ENERGY IN THE SUN AND THE HEATING OF THE CORONA, XVII (1).
Utrecht Observatory (Netherlands).
M. Kuperus. 1965, 72p

Descriptors: *Corona, *Energy transfer, *Sun, Acoustic, Energy, Field, Heating, Layer, Magnetic, Mechanical, Radiation, Solar, Structure, Transfer, Turbulent.

For abstract, see STAR 05 11.
N67-22996 HC$3.00 MF$0.65

MEASUREMENTS OF KILOMETER COSMIC RADIOEMISSION IN INTERPLANETARY SPACE.
Izmereniya Kilometrovogo Kosmicheskogo Radioizlucheniya V Mezhplanetnom Prostranstve
Volt Technical Corp., Washington, D. C.
V. I. Slysh. 9 Feb 67, 12p NASA-CR-83524, ST-RA-RWP-10560
Contract NAS5-12487
Transl. Into English From Kosmich. Issled. (Moscow), V. 6, Issue 6, 1966 P 923-931

Descriptors: *Cosmic radio wave, *Interplanetary space, *Radio emission, *Zond ii space probe, Cosmic, Emission, Galaxy, Intensity, Interplanetary, Ionosphere, Jupiter (planet), Kilometer, Low frequency, Measurement, Moon, Probe, Radio, Space, Spectrum, Upper, Wave.

For abstract, see STAR 05 11.
N67-23250 HC$3.00 MF$0.65

RELICT RADIATION OF THE UNIVERSE AND POPULATION OF ROTATION LEVELS OF INTERSTELLAR MOLECULES.
Reliktovoye Izlucheniye Vselennoy I Naselennost' Vrashchatel'nykh Urovney Mezhvezdnykh Molekul
Volt Technical Corp., Washington, D. C.
I. S. Shklovskiy. 23 Feb 67, 4p NASA-CR-83532, ST-IGA-NP-10567
Contract NAS5-12487
Transl. Into English From Astron. Tsirkular No. 364 of the Akad. Wauk Sssr, 29 Mar. 1966

Descriptors: *Cosmic radiation, *Interstellar material, *Molecular rotation, Astronomy, Cosmic, Intergalactic, Interstellar, Isotropic, Level, Material, Metagalaxy, Molecular, Optical, Planck equation, Radiation, Rotation, Sky, Spectrum, Temperature, Universe.

For abstract, see STAR 05 11.
N67-23258 HC$3.00 MF$0.65

SUCCESS OF LUNA-13. THE MOON IS NOT A DEAD HEAVENLY BODY.
Volt Technical Corp., Washington, D. C.
For primary bibliographic entry see Field 22A.
For abstract, see STAR 05 11.
N67-23259 HC$3.00 MF$0.65

THE STRUCTURE OF AN ATMOSPHERE FROM ON-BOARD MEASUREMENTS OF PRESSURE, TEMPERATURE, AND ACCELERATION.
National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
A. G. Boissevain, R. C. Hedland, S. C. Sommer, and L. Yee. Apr 67, 56p NASA-TN-D-3933

Descriptors: *Acceleration, *Meteorological probe, *Planetary atmosphere, *Pressure measurement, *Temperature measurement, Analysis, Atmosphere, Balloon, Calibration, Data, Drop, Entry, Instrumentation, Measurement, Meteorology, Molecular, Onboard, Planetary, Pressure, Probe, Simulation, Structure, Temperature, Test, Trajectory, Vehicle, Weight.

For abstract, see STAR 05 11.
N67-23302 HC$3.00 MF$0.65

3C. CELESTIAL MECHANICS

THE TROJAN MANIFOLD IN THE SYSTEM EARTH-MOON,
Boeing Scientific Research Labs Seattle Wash
Mathematics Research Lab
A. Deprit, Jacques Henrard, Julian Palmore, and J. F. Price. Feb 67, 51p Rept no. D1-82-0604, Mathematical note-506

Descriptors: (*Celestial mechanics, *Mathematical analysis), Earth (Planet), Moon, Periodic variations, Integration, Numerical analysis, Theory, Equilibrium, Orbital trajectories.

The Trojan manifold is defined as the analytical manifold of periodic orbits which contains the triangular equilibrium L4 as a singularity. Identification of the Earth-Moon system is made to a planar Restricted Problem of Three Bodies. The barycentric synodical coordinate system and the units of length, time and mass are chosen as defined by Wintner; the mass ratio is taken equal to about 0.012150. For this value, the triangular configuration of equilibrium, usually denoted by L4, is stable, and it generates two natural families of periodic orbits. (Author)
AD-651 147 HC$3.00 MF$0.65

CLOSED COLLISION PATHS IN A PLANE CIRCULAR RESTRICTED THREE-BODY PROBLEM.
Zamknutyye Trayektorii Soudareniya V Ploskoy Krugovoy Ogranichennoy Zadache Trekh Tel
National Aeronautics and Space Administration, Washington, D. C.
G. A. Krasinskiy. Apr 67, 20p NASA-TT-F-464
Transl. Into English From Byul. Inst. Teor. Astron. (USSR), V. 9, No. 2, 1963 P 154-167

Descriptors: *Boundary value problem, *Collision, *Flight path, *Three-body problem, Body, Boundary, Celestial, Circular, Closed, Dimensional, Double, Flight, Mechanics, Orbit, Path, Plane, Problem, Restriction, Three, Two, Value.

For abstract, see STAR 05 11.
N67-23309 HC$3.00 MF$0.65

4. ATMOSPHERIC SCIENCES

4A. ATMOSPHERIC PHYSICS

REMOTE SENSING OF ENVIRONMENT.
Michigan Univ Ann Arbor Inst of Science and Technology
For primary bibliographic entry see Field 22B.
AD-650 581 HC$3.00 MF$0.65

RADAR REFRACTIVE INDEX CALCULATIONS.
David Taylor Model Basin Washington D C Applied Mathematics Lab
For primary bibliographic entry see Field 17I.
AD-650 601 HC$3.00 MF$0.65

THE TROUGH SEEN IN HIGH LATITUDE OBSERVATIONS OF THE IONOSPHERIC ELECTRON CONTENT,
Ludwik Liszka. 9 Jan 67, 37p Rept no. Scientific-12
AFCRL-67-0175
Contract AF 61 (052)-678

Descriptors: (*Ionosphere, *Electron density), Polar regions, Atmospheric sounding, Radio beacons, Scientific satellites, Periodic variations, Diurnal variations, Thickness, Terrestrial magnetism, Photoelectrons, Heating, Sweden.

Results of 15 months observations of the ionospheric electron content made at Kiruna, Sweden are presented. Observations were made using the 40 and 41 MHz beacon of the S-66 satellite. Most of the night-time observations, except for the summer period, show a distinct trough in the electron content. Seasonal and diurnal variations of the

trough and of the electron content are studied. Also the corresponding equivalent slab thickness obtained using foF2 data from 6 Scandinavian ionosondes and geomagnetic control of the trough are investigated. Some features of the diurnal variation of electron content during the summer agree with the hypothesis of ionospheric heating by photoelectrons from the sunlit magnetic conjugate ionosphere. (Author)
AD-650 623 HC$3.00 MF$0.65

DIRECT PROBE MEASUREMENTS IN THE AURORAL IONOSPHERE.
Maryland Univ College Park Dept of Physics and Astronomy
For primary bibliographic entry see Field 20I.
AD-650 644 HC$3.00 MF$0.65

OPERATIONS, MAINTENANCE AND PARTS HANDBOOK FOR AFCRL IMPACTOR PROBE (WB-50),
General Mills Inc St Paul Minn Electronics Div
Calvin A. Hagberg. 25 May 62, 47p Rept no. GMI-2278
Contract AF 19 (604)-8843

Descriptors: (*Samplers, Atmosphere), Airborne, Operation, Maintenance, Handbooks, Probes, Particles, Impact, Meteorological instruments.

The handbook contains the information necessary to operate and maintain the AFCRL impactor probe as installed in the WB-50 weather reconnaissance aircraft.
AD-650 683 HC$3.00 MF$0.65

ABSORPTION SPECTRUM OF ACTIVATED NITROGEN IN THE 600 - 1100-A REGION.
Air Force Cambridge Research Labs L G Hanscom Field Mass
For primary bibliographic entry see Field 7D.
AD-650 704 Not available from CFSTI.

STUDIES OF THE IONOSPHERE USING TRANSMISSIONS FROM ACTIVE SATELLITES.
Annual summary rept. no. 1, 1 Feb 64-31 Jan 66,
Ghana Univ Legon Dept of Physics
John R. Koster, I. Katsriku, and M. Tete. 1 Aug 66, 100p
AFCRL-66-814
Contract AF 61 (052)-800

Descriptors: (*Ionosphere, Attenuation), Correlation techniques, Periodic variations, Electron density, Atmospheric motion, Scintillation, Anomalies, Communication satellites (Active), Atmospheric refraction, Computer programs.
Identifiers: Early Bird.

The theory of correlation analysis of fading records is reviewed and computer programs given for carrying out the analysis. Continuous observations over a period of 81 days of the 136 mc/s signal radiated by 'Early Bird' are described. Results include information on diurnal variation of total electron content, and new information on equatorial scintillation and the irregularities giving rise to it. The pattern on the ground was elongated by 60 - 1. The full correlation analysis of nearly 200 spaced receiver drift measurements made at Tamale, Ghana is presented. Drifts are westward by day, eastward by night, reversal occurring at about 07.30 and 20.00 GMT. A mid-morning maximum of about 200 m/sec. is a prominent feature in the F-region drift velocity. Mean F-Region drift velocity is 115 m/sec during the day, and 70 m/sec at night; E-Region velocity is 67 m/sec by day. Correlation ellipses are elongated with axial ratios of about 6 - 1. The total electron content of the ionosphere is studied as determined from observations of the Faraday Rotation of 20 mc/s signals radiated by S-66 over a period of 6 months. The diurnal variation of the electron content, and the development of the equatorial anomaly are shown. Refraction effects are shown to seriously affect 20 mc/s results at even moderate zenith angles.
AD-650 722 HC$3.00 MF$0.65

THEORETICAL STUDY OF THE PROPAGATION OF INTRASONIC WAVES IN THE ATMOSPHERE.
Avco Corp Wilmington Mass Avco Space Systems Div
For primary bibliographic entry see Field 20A.
AD-650 752 HC$3.00 MF$0.65

ELECTRIC FIELD HEATING OF D-REGION ELECTRONS.
Queen's Univ Belfast (Northern Ireland) Dept of Applied Mathematics
James C. G. Walker. 19 Apr 66, 7p
AFCRL-67-0121
Contract AF 61 (052)-780
Availability: Published in Planetary and Space Science v14 p987-90 1966.

Descriptors: (*Ionosphere, Electrons), (*Electrons, Heating), Plasma medium, Temperature, Electric fields, Terrestrial magnetism, Electric currents, Polarization, Wind, Great Britain.
Identifiers: Electron temperature.

It is shown that electric fields cannot heat electrons in the lower ionosphere to temperatures significantly above the gas temperature. For altitudes below about 85 km the argument is based directly on measured values of the characteristic energy of electrons in nitrogen. For altitudes above about 85 km the argument is based on the inhibiting effect of the geomagnetic field. Because electric currents are effectively continuous, most of the heating results from electron motion perpendicular to the magnetic field, which is inhibited by the Lorentz force. An electric field greater than 0.00035V/cm is needed to raise the electron temperature significantly, even at high altitudes. It would take a neutral wind of at least 700 m/sec to produce such a field by induction. (Author)
AD-650 758 Not available from CFSTI.

ELECTRON LOSS PROCESSES IN IONIZED GASES.
Pittsburgh Univ Pa Dept of Physics
For primary bibliographic entry see Field 20I.
AD-650 772 Not available from CFSTI.

LABORATORY MEASUREMENTS OF ELECTRON-ION RECOMBINATION COEFFICIENTS.
Pittsburgh Univ Pa Dept of Physics
For primary bibliographic entry see Field 20I.
AD-650 773 Not available from CFSTI.

WIND MEASUREMENTS IN THE SUBPOLAR MESOPAUSE REGION.
Atmospheric Sciences Lab White Sands Missile Range N Mex
For primary bibliographic entry see Field 4B.
AD-650 813 HC$3.00 MF$0.65

DETERMINATION OF A D-REGION NITRIC OXIDE DENSITY PROFILE BY VLF RADIO PROPAGATION.
Lowell Technological Inst Research Foundation Mass
Daniel P. Hayes, and Gary S. Sales. Feb 67, 38p Rept no. Scientific-1, LTIRF-264/IP
AFCRL-67-0170
Contract AF 19 (628)-4801
Sponsored by DASA.

Descriptors: (*Ionosphere, *Nitrogen oxides), Ionospheric propagation, Very low frequency, Plasma medium, Photolysis, Solar radiation, Gas ionization, X rays, Reaction kinetics.

Experimental VLF radio propagation data was to deduce a D-region Nitric Oxide density profile in the 70-90 km height range. (Author)
AD-650 873 HC$3.00 MF$0.65

EQUILIBRIUM AIR RADIATION FROM THE STAGNATION REGION OF HIGH VELOCITY SPHERES.
Naval Ordnance Lab White Oak Md
Robert A. Leverance, and Eugene J. Ruane. 21 Dec 66, 20p Rept no. NOLTR-65-199, Ballistics Research-151

Descriptors: (*Atmosphere entry, *Spectra (Visible + ultraviolet)), (*Stagnation point, Spheres), Air, Blunt bodies, Velocity, Nylon, Copper, Models (Simulations).

Experimental air radiation intensity measurements were taken in the stagnation region of high velocity models. The models used were copper-clad nylon spheres. Initial range conditions varied in velocity from 16,000 to 19,000 feet per second, and in pressure from 8 to 24 torr. Radiation measurements were taken over narrow (20A) bands in the spectrum from 2750 to 5900 angstroms. The experimental values were in close agreement with theoretical predictions. (Author)
AD-650 924 HC$3.00 MF$0.65

THE VARIATION OF AIR DENSITY AT A HEIGHT OF 220 km IN THE FIRST HALF OF 1966.
Technical rept.,
Royal Aircraft Establishment Farnborough (England)
D. G. King-Hele, and Eileen Quinn. Nov 66, 14p Rept no. TR-66350

Descriptors: (*Upper atmosphere, Density), (*Solar radiation, Upper atmosphere), Satellites (Artificial), Orbital trajectories, Drag, Periodic variations, Perigee, Magnetic storms, Great Britain.
Identifiers: Star-rad.

The changes in the orbit of the satellite Star-rad (1962 beta, kappa) between January and June 1966 are analysed to determine the variation in upper-atmsophere density at a standard height (220 km) a little above the satellite's perigee height. It is found that the air density in May-June was about 30% greater than in January-February, as a result of the increase in solar activity. The fluctuations in density on a shorter time-scale, 2 to 3 days, are also shown. (Author)
AD-650 941 HC$3.00 MF$0.65

THEORETICAL AND EXPERIMENTAL INVESTIGATIONS ON THREE-DIMENSIONAL (LAMINAR AND TURBULENT) BOUNDARY LAYERS, IN PARTICULAR ON PROBLEMS OF TRANSITION, SEPARATION AND REATTACHMENT.
Poitiers Univ (France) Laboratoire de Mecanique des Fluides
For primary bibliographic entry see Field 20D.
AD-650 952 HC$3.00 MF$0.65

THE ROLE OF S-SHAPED CROSSFLOW PROFILES IN THREE-DIMENSIONAL BOUNDARY LAYER THEORY.
Poitiers Univ (France) Laboratoire de Mecanique des Fluides
For primary bibliographic entry see Field 20D.
AD-650 953 HC$3.00 MF$0.65

BALLOON-BORNE GRATING SPECTROMETER.
Denver Univ Colo Dept of Physics
For primary bibliographic entry see Field 20F.
AD-650 968 Not available from CFSTI.

IONOSPHERIC REFRACTION EFFECTS ON THE DOPPLER SHIFT OF RADIO TRANSMISSIONS FROM ARTIFICIAL EARTH SATELLITES.
Texas Univ Austin Defense Research Lab 4410
For primary bibliographic entry see Field 20N.
AD-650 985 HC$3.00 MF$0.65

STIMULATION OF OPTICAL EMISSIONS IN ATMOSPHERIC GASES.
Utah State Univ Logan Electro-Dynamics Labs
For primary bibliographic entry see Field 7E.
AD-651 017 HC$3.00 MF$0.65

EXPERIMENTAL INVESTIGATION OF THE ABSORPTION OF INFRARED RADIATION.
Philco-Ford Corp Newport Beach Calif Aeronutronic Div
For primary bibliographic entry see Field 7D.
AD-651 043 HC$3.00 MF$0.65

LIST OF TRANSLATIONS 1966: FOREIGN LITERATURE RELATING TO THE GEOPHYSICAL SCIENCES.
Research trans.
American Meteorological Society Boston Mass
Feb 67, 25p
TT-67-61651
Contract AF 19 (628)-3880
See also AD-636 983.

Descriptors: (*Geophysics, Bibliographies), Scientific research, France, West Germany, Italy, Poland, USSR, East Germany.

The translations cited are complete, with figures, equations, and literature cited. The 'List of Translations' is divided alphabetically by language, and the items are numbered chronologically by date of translation under each language heading.
AD-651 044 HC$3.00 MF$0.65

RESEARCH ON FLUID DYNAMICAL MODELS OF THE LARGE SCALE ATMOSPHERIC CIRCULATIONS.
Final scientific rept., 1 Jan 65-31 Mar 67
Brown Univ Providence R I Dept of Physics
Howard A. Snyder. Apr 67, 94p
AFCRL-67-0166
Contract AF 19 (628)-4783

Descriptors: (*Fluid dynamic properties, Atmosphere), (*Atmosphere, *Hydrodynamics), (*Atmospheric motion, Fluid dynamic properties), Convection (Heat transfer), Atmosphere models, Atmospheric tides, Rheology, Polymers, Couette flow.

The report describes three investigations in the field of hydrodynamic stability. The purpose of the experiments is to study the mechanisms which operate in the large scale circulation of the atmosphere. It is generally assumed that secondary flows in the form of baroclinic waves are the primary cause of the propagation of atmospheric disturbances. These waves must be treated as finite amplitude disturbances and accordingly the use of non-linear analysis is required to predict the properties of the waves. Past attempts at calculating finite amplitude secondary flows have not been very successful but recently Stuart and Watson have developed a method which has proved to be reliable. The computations for the case of isothermal flow between concentric rotating cylinders has been carried out using this method and one of the investigations described here is an experimental verification of the theoretical predictions. It is also shown that a logical extension of the theory requires the existence of jets and shock-like structure in the flow field and these features are demonstrated experimentally. In a second investigation it is shown strongly affected by horizontal shear. Horizontal shear has a strong stabilizing effect on baroclinic waves. The third set of experiments demonstrates the strong stabilizing action of high polymer non-Newtonian fluids. (Author)
AD-651 046 HC$3.00 MF$0.65

SYMPOSIUM ON INTERDISCIPLINARY ASPECTS OF RADIATIVE ENERGY TRANSFER.
General Electric Co Philadelphia Pa Missile and Space Div
For primary bibliographic entry see Field 20F.
AD-651 048 HC$3.00 MF$0.65

THE DECAY OVER LONG DISTANCES OF ROCKET-RELEASED LITHIUM DUE TO DIFFUSION, WINDS, AND CHEMICAL REACTIONS,
Saskatchewan Univ Saskatoon Inst of Upper Atmospheric Physics
William A. Gault, and Howard N. Rundle. 31 Jan 66, 12p Rept no. Scientific-ER-1
AFCRL-66-857
Contract AF 19 (628)-5720
Continuation of contract AF 19 (628)-2829.
Availability: Published in Canadian Journal of Physics v44 p1099-1107 1966.

Descriptors: (*Lithium, Air pollution), (*Atmospheric sounding, Lithium), Diffusion, Wind, Chemical reactions, Upper atmosphere, Canada.
Identifiers: Chemical-release studies.

An enhancement of atmospheric lithium was observed over Saskatoon during March, 1965, following a rocket release of lithium at Churchill. A diffusion coefficient, an average wind velocity, and upper limits on certain lithium chemical reactions are calculated from the observations after certain assumptions are made. The horizontal diffusion coefficient, applicable over distances of 1000 kilometers and times of weeks, is larger than diffusion coefficients over shorter distances and times. The vertical diffusion coefficient between 60 and 80 kilometers in height appears to be much lower than the large horizontal coefficients. (Author)
AD-651 082 Not available from CFSTI.

MONTHLY MEAN 100-, 50-, 30-, AND 10-MILLIBAR CHARTS JANUARY 1964 THROUGH DECEMBER 1965 OF THE IQSY PERIOD.
Technical rept.
Weather Bureau Silver Spring Md
Feb 67, 106p Rept no. ESSA-TR-WB-1

Descriptors: (*Meteorological charts, Northern hemisphere), Barometric pressure, Atmospheric temperature, Meteorological parameters, Atmospheric sounding, Data processing systems, Analysis.

Monthly mean 100-, 50-, 30-, and 10-mb. analyses for the IQSY period, January 1964 through December 1965, have been produced with the aid of electronic computer. The charts are presented along with brief descriptions of the automatic data processing and objective analysis procedures employed. (Author)
AD-651 101 HC$3.00 MF$0.65

PREDICTION AND MAINTENANCE OF RADIATION FOG.
Interim rept., 15 Aug 66-14 Feb 67,
Utah Univ Salt Lake City
Wilford G. Zdunkowski, Barry C. Nielsen, and Gunther Korb. Mar 67, 69p
ECOM-0049-S1
Contract DAAB07-67-C-0049
Prepared in cooperation with Munich Univ. (West Germany), Theoretische Meteorologie Institut.

Descriptors: (*Weather forecasting, *Fog), Clouds, Thermal radiation, Dew point, Solar radiation, Temperature, Wind, West Germany.
Identifiers: Radiation fog.

This study deals with the prediction and maintenance of radiation fog. In conjunction with this study, two theoretical problems are discussed which form the basis for the prediction of radiation fog, its growth and eventually its dispersal by clouds or solar radiation. The first part of this investigation concerns itself with the prediction of temperature and wind profiles. The theory of radiative transfer for nonscattering particles and absorbing gases is included in the differential equations describing the physics of the boundary layer. The second problem discusses the mathematical theory of the distribution of short and long wave radiation in a multiple scattering and absorbing cloud or fog consisting of droplets and gases. A new solution of the equation of radiative transfer theory as formulated by Chandrasekhar (1960) is presented here. No attempt has been made at this time to include the complete transfer theory in the prediction equations. (Author)
AD-651 115 HC$3.00 MF$0.65

THE SCALE SIZE OF SCINTILLATION-PRODUCING IRREGULARITIES IN THE AURORAL IONOSPHERE,
Boeing Scientific Research Labs Seattle Wash Geo-Astro Physics Lab
J. M. Lansinger, and E. J. Fremouw. Jan 67, 32p Rept no. D1-82-0594
Contract NAS5-3940, Grant NSF-GP-5540

Descriptors: (*Ionospheric disturbances, Scientific research), Scintillation, Aurorae, Atmospheric refraction, Stars, Extraterrestrial radio waves, Atmosphere, Ionospheric propagation.
Identifiers: F-layer.

Measurements of the transverse scale of F-layer irregularities, based on radio-star observations from College, Alaska, at frequencies of 68 and 223 MHz, are reported. Analysis by the two-frequency scintillation-ratio technique yields typical scales of 600 to 700 meters for mid-auroral latitudes. Typical scales of one kilometer are found for higher-latitude irregularities. The latter show increasing scale with increasing magnetic index. Analysis by the two-frequency correlation technique produces erroneously small scales due to refraction effects. (Author)
AD-651 156 HC$3.00 MF$0.65

UPPER ATMOSPHERE PRESSURE MEASUREMENTS WITH THERMAL CONDUCTIVITY GAUGES,
Atmospheric Sciences Lab White Sands Missile Range N Mex
For primary bibliographic entry see Field 4B.
AD-651 216 HC$3.00 MF$0.65

OPTICAL RADAR MEASUREMENTS OF THE ATMOSPHERE.
College of William and Mary, Williamsburg, Va.
F. R. Crownfield, Jr., J. D. Lawrence, Jr., and M. P. Mc Cormick. Apr 67, 54p

Descriptors: *Atmospheric scattering; *Mie scattering function, *Optical radar, Angle, Atmospheric, Backscatter, Computer, Function, Intensity, Light, Optical, Printout, Radar, Ratio, Scattering, Signal-to-noise, Solid.

For abstract, see STAR 05 11.
N67-21982 HC$3.00 MF$0.65

EXPERIMENTAL INVESTIGATION OF THE EQUATORIAL IONOSPHERIC ANOMALY IN AFRICA IN THE PERIOD OF SOLAR MINIMUM.
Etude Experimentale de L'anomalie Ionospherique Equatoriale en Afrique en Periode de Minimum Solaire
Volt Technical Corp., Washington, D. C.
P. Vila. 15 Mar 67, 12p NASA-CR-83560, ST-AI-10577

Contract NAS5-12487
Transl. Into English From Ann. Geophys. (Paris), V. 22, No. 3, 1966 P 396-404

Descriptors: *Africa, *Equator, *F layer, *Ionization, Activity, Airborne, Anomaly, Ionospheric, Minimum, Radiation, Solar, Sounding.

For abstract, see STAR 05 11.
N67-22286 HC$3.00 MF$0.65

INTENSITY VARIATIONS OF H ALPHA AND N Ii 6 583 A LINES IN THE NIGHT SKY SPECTRUM.
Sur les Variations D'intensite des Raies H Alpha and N Ii 6 583 A Dans le Spectre Du Ciel Nocturne
Volt Technical Corp., Washington, D. C.
J. Dufay, M. Dufay, and N. Huu-doan. 15 Mar 67, 6p NASA-CR-83561, ST-AP-AE-SPC-10578
Contract NAS5-12487
Transl. Into English From Compt. Rend. Acad. Sci. Astrophys. Et Aeronomie (Paris), Aug. 1961

Descriptors: *Intensity, *Night sky, *Spectral line, Alpha, Astrophysics, France, Line, Night, Observation, Sky, Spectral, Spectrography, Variation.

For abstract, see STAR 05 11.
N67-22287 HC$3.00 MF$0.65

STEADY GEOMAGNETIC MICROPULSATIONS AND SOLAR CORPUSCULAR STREAMS.
Ustoychivyye Geomagnitnyye Mikropul'satsii I Solnechnyye Korpuskulyarnyye Potoki
Volt Technical Corp., Washington, D. C.
V. O. Bolshakova. 17 Feb 67, 6p NASA-CR-83563, ST-GM-SP-10564
Contract NAS5-12487
Transl. Into English From Geomagnetizm I Aeronomiya (Moscow), V. 6, No. 6, 1967 P 1089-1093

Descriptors: *Geomagnetic micropulsation, *Solar stream, Corpuscular, Flow, Gas, Geomagnetic, Intensity, Micropulsation, Morphology, Radiation, Solar, Stream, U.S.S.R., Wind.

For abstract, see STAR 05 11.
N67-22294 HC$3.00 MF$0.65

AN ANALYSIS OF HIGH IONOSPHERE POSITIVE ION RAM PROBES.
Pennsylvania State Univ., University Park. Ionosphere Research Lab.
B. A. Pontano. 1 Mar 67, 59p NASA-CR-83322, SR-291
Grant NSG-134-61, Contract DA-ARO/D/-31-124-G659

Descriptors: *Data analysis, *Ion probe, *Upper ionosphere, Analysis, Data, Design, Instrument, Ion, Ionosphere, Javelin rocket, Mother-daughter project, Planar, Probe, Rocketborne, Spherical, Upper.

For abstract, see STAR 05 11.
N67-22357 HC$3.00 MF$0.65

SODIUM VAPOR EXPERIMENT QUARTERLY PROGRESS REPORT, 1 JUL. - 30 SEP. 1966.
Gca Technology Div., Gca Corp., Bedford, Mass.
J. F. Bedinger. Oct 66, 20p NASA-CR-83394, QPR-5
Contract NAS5-3970

Descriptors: *Dynamics, *Sodium vapor, *Sounding rocket, *Upper atmosphere, Analysis, Atmosphere, Densitometer, Ejection, Motion, Rocket, Sodium, Sounding, Triangulation, Upper, Vapor.

For abstract, see STAR 05 11.
N67-22436 HC$3.00 MF$0.65

ORBITAL AND HIGH ALTITUDE PROBING POTENTIAL OF GUN LAUNCHED ROCKETS.
Mcgill Univ., Montreal (Quebec). Space Research Inst.
G. V. Bull, D. Lyster, and G. V. Parkinson. Oct 66, 60p R-SRI-H-R-13

Descriptors: *Earth orbit, *Harp project, *Meteorological probe, Earth, Gun, High altitude, Launch, Meteorology, Orbit, Probe, Reentry, Rocket, Trajectory.

For abstract, see STAR 05 11.
N67-22465 HC$3.00 MF$0.65

NINETEEN-SIXTY-SIX SESSION OF THE GODDARD SUMMER WORKSHOP FINAL REPORT.
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
1967, 496p NASA-TM-X-55742, X-700-67-94
Workshop Held 15 Jun. - 15 Sep. 1966

Descriptors: *Atmospheric composition, *Information processing, *Magnetic field, *Plasma, *Radiation effect, *Structural dynamics, Antenna, Atmospheric, Composition, Computer programming, Dynamics, Effect, Information, Langmuir probe, Machine language, Processing, Radiation, Reliability, Spectral analysis, Structural, Thermopile.

For abstract, see STAR 05 11.
N67-22741 HC$3.00 MF$0.65

COSMIC RAY NM-64 NEUTRON MONITOR DATA- V MONTHLY GRAPHS, JAN. - DEC. 1966.
Atomic Energy of Canada, Ltd., Chalk River (Ontario).
J. F. Steljes. Jan 67, 77p CRGP-1253, AECL-2664

Descriptors: *Annual variation, *Cosmic ray propagation, *Neutron flux, Barometer, Correction, Cosmic, Diurnal, Flux, Monitor, Neutron, Polyethylene, Propagation, Ray, Season, Variation.

For abstract, see STAR 05 11.
N67-22900 HC$3.00 MF$0.65

SPECTROMETRY OF PRIMARY PROTONS AND OF SOLAR ORIGIN PROTONS AT SKOGAR, ICELAND (1 APPROXIMATELY 5,7).
Spectrometrie de Protons Primaires Et de Protons D'origine Solaire A Skogar-islande (L Approximativement 5,7)
Centre D Etude Spatiale des Rayonnements, Toulouse (France).
F. Cambou, J. C. Guyader, and H. Reme. 1966, 22p
in French Presented At the Inter-union Symp. on Solar Terrest. Phys., Belgrade, 29 Aug.-2 Sep. 1966 Submitted for Publication

Descriptors: *Cerenkov counter, *Primary cosmic radiation, *Scintillation counter, *Solar proton, *Spectrometry, Balloon, Conference, Cosmic, Counter, Energy, Loss, Measurement, Meteorology, Primary, Proton, Radiation, Scintillation, Solar, Spectrum, Telescope.

For abstract, see STAR 05 11.
N67-22918 HC$3.00 MF$0.65

MEASUREMENT OF AURORAL X-RAYS.
Mesure Du Rayonnement X Auroral
Centre D Etude Spatiale des Rayonnements, Toulouse (France). Faculte des Sciences.
F. Cambou, F. Cotin, and H. Reme. 1966, 19p
in French Presented At the 7th Intern. Symp. on Space Sci., Vienna, May 1966

Descriptors: *Auroral emission, *Balloon sounding, *Scintillation spectrometer, *X-ray spectrometry, Absorption, Aurora, Balloon, Emission, Magnetic, Measurement, Periodicity, Pulse, Scintillation, Sounding, Spectrometer, Spectrometry, X-ray.

For abstract, see STAR 05 11.
N67-22932 HC$3.00 MF$0.65

COSMIC RAY NM-64 NEUTRON MONITOR DATA - IV MONTHLY GRAPHS, JAN. - AUG. 1966.
Atomic Energy of Canada, Ltd., Chalk River (Ontario).
J. F. Steljes. Sep 66, 68p CRGP-1244, AECL-2663

Descriptors: *Canada, *Cosmic ray, *Table, Cosmic, Counting, Graph, Monitor, Neutron, Rate, Ray, Station.

For abstract, see STAR 05 11.
N67-22974 HC$3.00 MF$0.65

IONOSPHERIC DATA FOR SEPTEMBER 1966 FROM SALISBURY, SOUTH AUSTRALIA.
Weapons Research Establishment, Salisbury (Australia). Dept. of Supply.
Oct 66, 24p CPD-1966/9/S/

Descriptors: *Australia, *Data recording, *Ionospheric sounding, Bandwidth, Data, Frequency, Height, Hour, Ionosonde, Ionospheric, Length, Meteorology, Parameter, Pulse, Recording, Sounding, Transmission, Upper atmosphere, Weather.

For abstract, see STAR 05 11.
N67-23010 HC$3.00 MF$0.65

IONOSPHERIC DATA FOR APRIL 1966 FROM WOOMERA, SOUTH AUSTRALIA.
Weapons Research Establishment, Salisbury (Australia). Dept. of Supply.
Oct 66, 24p CPD-1966/4/W/

Descriptors: *Australia, *Data recording, *Ionospheric sounding, Bandwidth, Data, Frequency, Height, Hour, Ionosonde, Ionospheric, Meteorology, Parameter, Pulse, Recording, Sounding, Table, Transmission, Upper atmosphere, Weather.

For abstract, see STAR 05 11.
N67-23011 HC$3.00 MF$0.65

SYMMETRY OF A GEOCENTRIC DUST BELT AND THE ZODIACAL LIGHT.
Royal Aircraft Establishment, Farnborough (England).
R. R. Allan, and G. E. Cook. Aug 66, 11p RAE-TR-66257

Descriptors: *Dust, *Zodiacal light, Force, Geocentric, Gravitational, Light, Orbit, Pressure, Radiation, Solar, Zodiac.

For abstract, see STAR 05 11.
N67-23094 HC$3.00 MF$0.65

THE SYNTHESIS OF 15 MU INFRARED HORIZON RADIANCE PROFILES FROM METEOROLOGICAL DATA INPUTS.
Honeywell, Inc., Minneapolis, Minn.
J. C. Bates, R. OB.Carpenter, J. C. Gille, D. S. Hanson, and F. B. House. Apr 67, 307p NASA-CR-724
Contract NAS1-6010

Descriptors: *Atmospheric radiation, *Computer program, *Infrared horizon, *Mathematical model, Absorption, Analysis, Atmospheric, Band, Car-

bon dioxide, Cloud, Computer, Doppler effect, Effect, Equilibrium, Horizon, Infrared, Input, Model, Pressure, Profile, Program, Radiance, Radiation, Spectral, Temperature, Thermodynamic.

For abstract, see STAR 05 11.
N67-23304 HC$3.00 MF$0.65

SOLAR AND GEOMAGNETIC EFFECTS ON UPPER ATMOSPHERIC TEMPERATURE.
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
S. Chandra, and B. V. Krishnamurthy. May 67, 14p NASA-TM-X-55749, X-615-67-109
Prepared for Publication

Descriptors: *Atmospheric temperature, *Corpuscular radiation, *Solar effect, *Ultraviolet radiation, *Upper atmosphere, Activity, Correlation, Extreme, Flux, Geomagnetic, Sunspot, Variation.

For abstract, see STAR 05 11.
N67-23319 HC$3.00 MF$0.65

THE ORDERED MAGNETIC FIELD OF THE MAGNETOSHEATH.
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
D. H. Fairfield. Apr 67, 38p NASA-TM-X-55750, X-612-67-174

Descriptors: *Geomagnetic field, *Imp, *Interplanetary magnetic field, *Satellite measurement, Convection, Field, Fluctuation, Geomagnetic, Interplanetary, Magnetic, Magnetopause, Measurement, Orientation, Satellite, Sheath.

For abstract, see STAR 05 11.
N67-23320 HC$3.00 MF$0.65

PROTON-ELECTRON SPECTROMETER EXPERIMENTS ON GEMINI-4 AND GEMINI-7 FINAL REPORT, 27 MAY 1963 - 30 SEP. 1966.
Lockheed Missiles and Space Co., Palo Alto, Calif. Research Lab.
For primary bibliographic entry see Field 22A.
For abstract, see STAR 05 11.
N67-23326 HC$3.00 MF$0.65

REALIZATION OF A RADIO ASTRONOMY EXPERIMENT IN SPACE.
Realisation D'une Experience de Radioastronomie Spatiale
Paris Observatory, Meudon (France).
J. Lacroix. 19 Dec 66, 241p
in French

Descriptors: *Electromagnetic measurement, *Rubis rocket, *Very low frequency, Amplifier, Antenna, Electromagnetic, Frequency, Ionosphere, Measurement, Radiation, Radio, Rocket, Sounding.

For abstract, see STAR 05 11.
N67-23383 HC$3.00 MF$0.65

ON THE QUASI-LINEAR LIMIT OF A DRIFT INSTABILITY AND ITS RELATION TO AURORAL BOMBARDMENT.
International Centre for Theoretical Physics, Trieste (Italy).
N. A. Krall. Sep 66, 15p IC/66/103
Submitted for Publication

Descriptors: *Auroral bombardment, *Drift, *Electromagnetic wave, *Radiation belt, Aurora, Belt, Bombardment, Density, Electromagnetic, Field, Instability, Limit, Magnetic, Mode, Particle, Plasma, Propagation, Quasi-linear, Radiation, Theory, Wave, Zone.

For abstract, see STAR 05 11.
N67-23394 HC$3.00 MF$0.65

PHYSICAL STRUCTURE OF RESONANCE RADIATIONS EMITTED BY AN ALKALI ARTIFICIAL CLOUD AND MEASUREMENT OF IONOSPHERE TEMPERATURE.
Structure Physique des Raies de Resonance Emises Par Un Nuage Artificiel D'alcalins Et Mesure de La Temperature de L'ionosphere
Centre National de La Recherche Scientifique, Verrieres-le-buisson (France).
M.-L. Lory-chanin. 4 Jun 65, 51p
in French, English Summary Its Ser. A, No. 4617

Descriptors: *Alkali, *Artificial cloud, *Ionospheric temperature, *Radiation emission, Altitude, Artificial, Cloud, Emission, Ionospheric, Perturbation, Potassium, Radiation, Resonance, Sodium, Temperature, Transfer, Upper atmosphere.

For abstract, see STAR 05 11.
N67-23399 HC$3.00 MF$0.65

A THREE-DIMENSIONAL RAY TRACING COMPUTER PROGRAM.
Institutes for Environmental Research, Boulder, Colo.
For primary bibliographic entry see Field 20N.
PB-174 502 HC$3.00 MF$0.65

4B. METEOROLOGY

MISSILE GEOPHYSICS RESEARCH TOWER.
Technical memo.,
Army Signal Missile Support Agency, White Sands Missile Range, N. Mex.
M. E. McLardie.Jan 59, 30p TM-588

Descriptors: (*Geophysics, *Meteorological parameters), (*Air control centers, *Meteorological instruments), Instrumentation, Guided missile ranges, Scientific research, Acoustic equipment, Anemometers, Sound ranging, Wind, Vector analysis.

New methods in the collection and reduction of raw meteorological and related data at the Research Tower, developed as the result of limitations experienced in instrument accuracy and speed of response are explained in this progress report. The functions of such instrumentation as acoustic anemometers, Particulate Sensors, three-dimensional Sound Ranging Arrays, and microbarographs, and their method of installation on the tower are discussed, as is the instrumentation used to obtain wind measurements, velocity variability, wind vector profiles, and other data required in the support of missile studies. (Author)
AD-210 021 HC$3.00

OROGRAPHIC EFFECTS ON PRECIPITATION PROCESSES.
Interim rept. no. 4, 15 Mar-14 Sep 66,
Oregon State Univ Corvallis
Laurence D. Mendenhall, and John V. McFadden. Mar 67, 22p
ECOM-03712-4
Contract DA-36-039-AMC-03712 (E)
See also AD-646 894.

Descriptors: (*Meteorological radar, *Atmospheric precipitation), (*Rainfall, Backscattering), Meteorological parameters, Radar pulses, Statistical functions, Power spectra, Azimuth, Freezing, Radar signals.

This report describes some results of preliminary analyses of pulse-to-pulse radar backscatter measurements of precipitation above and below the bright band. Other work reported on includes radar studies of orographic effects on precipitation and an unusual radar view of a lee-wave or rotor. A more comprehensive analysis of this other work will appear in the Final Report.
AD-650 572 HC$3.00 MF$0.65

DIAGNOSTIC STUDIES OF WEATHER SYSTEMS OF LOW AND HIGH LATITUDES (ROSSBY NUMBER < 1).
Final rept., 30 Nov 64-27 Feb 67,
California Univ Los Angeles Dept of Meteorology
T. N. Krishnamurti. Apr 67, 366p
AFCRL-67-0128
Contract AF 19 (628)-4777, Grant Cwb-11210
Research supported in part by NASA, grant NsG-237-62. See also AD-636 254.

Descriptors: (*Convection (Atmospheric), Convergence), (*Air mass analysis, *Meteorological charts), Tropical cyclones, Wind, Velocity, Boundary value problems, Meteorological parameters, Meteorological phenomena, Computer programs, Programming languages, Heat transfer, Marine meteorology.

A theory of a general balance model for small Rossby numbers, including effects of latent heat, friction and terrain is presented with some applications in high and low latitudes.
AD-650 573 HC$3.00 MF$0.65

AN ANNOTATED BIBLIOGRAPHY OF METEOROLOGICAL TOWER AND MAST STUDIES - WB/BS-5,
Environmental Science Services Administration Silver Spring Md Environmental Data Services
J. Allen Wallace, Jr. Jan 67, 113p

Descriptors: (*Meteorological parameters, Bibliographies), Subject indexing, Abstracts, Atmospheric motion, Wind, Meteorology, Data.

The bibliography consists of sources containing meteorological data and information obtained from towers and mast. Primary interest is on wind data. All available sources in the U. S. Department of Commerce, Atmospheric Sciences Library, Environmental Sciences Services Administration, were examined and abstracted. (Author)
AD-650 781 HC$3.00 MF$0.65

METEOROLOGICAL MEASUREMENT SYSTEM.
Final rept.,
Electromagnetic Research Corp College Park Md
Martin Katzin, William P. Markey, James H. Meyer, Jr., David L. Ringwalt, and Thomas S. Weaver. Mar 67, 181p
RADC-TR-67-58
Contract AF 30 (602)-4233

Descriptors: (*Meteorological parameters, Measurement), Electromagnetic waves, Refraction, Adsorption, Scattering, Propagation, Diagrams, Tables, Meteorological instruments, Data storage systems, Magnetic tape, Data.

The report presents the results of a design study of a Meteorological Measurement System for use in studying the correlation of the lower atmosphere's meteorological constituents with the propagation of electromagnetic energy. Techniques employed in the measurement of the pertinent meteorological parameters are discussed and the types of available sensors having accuracies and response times meeting the requirements of the program are described. The problem of comparing an integrated measurement of refractivity with point measurements of the meteorological parameters at intervals along the path is described, and a method is given for determining the number of point measurements required to achieve a desired accuracy. Recommendations are given for two independent measurement configurations, one for use in the Improved Sampling Techniques Program, the other for use in the Optical Propagation

Program. A detailed logic design is given of the data storage and monitoring system which is capable of accepting data from a large number of sensors at a controllable sampling rate. (Author)
AD-650 790 HC$3.00 MF$0.65

WIND MEASUREMENTS IN THE SUBPOLAR MESOPAUSE REGION,
Atmospheric Sciences Lab White Sands Missile Range N Mex
James Eugene Morris. Jan 67, 31p
ECOM-5105

Descriptors: (*Mesosphere, Alaska), (*Radar confusion reflectors, Sensors), Wind, Velocity, High altitude, Atmosphere, Sampling, Periodic variations, Noctilucent clouds.

Mesospheric wind data obtained with a new high altitude Loki system during the summer of 1966 over Fort Greely, Alaska, are presented. Soundings, utilizing very light chaff as a wind sensor, were scheduled near noon and midnight for a 50-hour period. These data are from a sparsely sampled region of the atmosphere. The diurnal variations and the high velocities observed give valuable information regarding noctilucent clouds, atmospheric tidal oscillations, and the mean summer flow near the subpolar mesopause.
AD-650 813 HC$3.00 MF$0.65

ARSR WEATHER SURVEILLANCE RADAR KIT.
Raytheon Co Wayland Mass
For primary bibliographic entry see Field 17I.
AD-650 815 HC$3.00 MF$0.65

SUMMARY OF SHORT-PERIOD TERMINAL WEATHER INFORMATION STUDIES.
Final rept., Jul 64-Sep 65,
Travelers Research Center Inc Hartford Conn
Keith D. Hage, Herbert D. Entrekin, and James W. Wilson. Oct 65, 69p
FA-RD-65-120
Contract FA-65-WA-1192

Descriptors: (*Weather forecasting, Experimental data), (*Weather stations, Aviation safety), Data processing systems, Magnetic tape, Climatology, Fog, Visibility, Dew point, Clouds, Ceiling.

Computer programs for converting data from punched paper tape to magnetic tape, and for decoding, errpr-checking, and summarizing the digital weather observations of the Federal Aviation Agency Mesonetwork surrounding Atlantic City, N.J. were developed and tested. The objectives and scope of these programs are described and sample outputs are illustrated. Twenty-five summer-season data samples from 5 to 8 mesonetwork stations were processed. Brief summaries are given of the results of additional investigations carried out under the present project and previously described in other reports. The investigations were studies of space and time variations in transmission along runways at John F. Kennedy International Airport, case studies of fog and low cloud in the Washington, D. C. Mesonetwork, and studies of radar forecasts of visual range in snow.
AD-650 826 HC$3.00 MF$0.65

COMPARISON OF JIMSPHERE AND RAWINSONDE WIND SHEARS.
Final rept.,
Control Data Corp Minneapolis Minn Research Div
A. D. Belmont, and W. C. C. Shen. 15 Nov 66, 103p
Contract N00014-66-C-0127, ARPA Order-756

Descriptors: (*Wind, Shear stresses), Radiosondes, Meteorological balloons, Data.
Identifiers: Jimspheres.

Characteristics of the wind shear for 25 meter layers were prepared from a series of 175 detailed wind ascents to 18 km taken with a Jimsphere balloon followed by FPS-16 radar from November 1964 to June 1965. To determine how well the shears for small layers could be estimated from rawinsonde data, two new sets of ascents were created from the original Jimsphere data. One set consisted of wind data at 23 levels corresponding only to standard pressure levels, and the other set at the 46 'minute' levels at which winds are reported on observational forms. The differences in results were thus due only to the differing vertical resolution in the three series. The results showed that the magnitudes of the mean pressure and minute shears for 25 meters are smoothed to about 1/3 and 1/2 respectively of the Jimsphere shears. Graphs of corrections for pressure and minute data needed to approximate the Jimsphere shear are presented both in terms of thickness of layer, and, for 25 m as a function of height. The mean Jimsphere shear for a 25 meter layer increases from 0.3 m/sec at the lowest levels to 0.5 at 11 km and to 0.8 at 17 km, with a standard deviation of about 70% of the mean. (Author)
AD-650 836 HC$3.00 MF$0.65

INVESTIGATION OF THE KINETICS OF CONDENSATION.
Berg (T G Owe) Inc Santa Ana Calif
For primary bibliographic entry see Field 7D.
AD-650 848 HC$3.00 MF$0.65

EVALUATION OF AIR TRAFFIC CONTROL RADAR WEATHER DATA.
National Aviation Facilities Experimental Center Atlantic City N J
For primary bibliographic entry see Field 17I.
AD-650 858 HC$3.00 MF$0.65

THUNDERSTORM ACTIVITY IN THE LENINGRAD REGION IN 1962.
Research trans.,
American Meteorological Society Boston Mass
A. I. Astashenko. Mar 67, 6p Rept no. T-R-572
TT-67-61621
Contract AF 19 (628)-3880
Grozovaya Aktivnost v Leningradskoi Oblasti v 1962 g., Trans. of Glavnaya Geofizicheskaya Observatoriya, Leningrad. Trudy (USSR), n157 (219) p68-9 1964.

Descriptors: (*Thunderstorms, USSR), Meteorological phenomena, Direction finding, Meteorological radar, Distribution, Meteorological parameters, Atmospherics, Maps, Finland.

Data are given on the distribution of thunderstorm activity in the Leningrad region. They are based on the observations of one radio direction-finding station near Leningrad.
AD-650 886 HC$3.00 MF$0.65

LOW LEVEL PERSISTENCY ANALYSIS FOR SOUTHEAST ASIA (2000 a/0 3).
Weather Wing (1st) San Francisco Calif Detachment 1
Mar 67, 151p Rept no. WW-1-Special Study-105-13/2

Descriptors: (*Meteorological charts, Asia), (*Weather forecasting, Vietnam), Laos, Cambodia, Thailand, Probability, Visibility, Terrain, Meteorological parameters, Ceiling.

This special study was prepared primarily as a planning aid to forecasters in 1st Weather Wing units located in Southeast Asia. For the purpose of this study Southeast Asia is defined as North Vietnam, Republic of Vietnam, Laos, Cambodia and Thailand. Information contained in this publication is based on climatic averages and should not be construed as a forecast. Interpretation of data should be made only by a qualified weather forecaster. Minor differences may appear between similar maps in this book and 1WWSS 105-12/1 due to less available data for this study.
AD-650 903 HC$3.00 MF$0.65

RAINDROP DISTRIBUTIONS AT MAJURO ATOLL, MARSHALL ISLANDS.
Technical rept., 11 Mar 59-29 Apr 60,
Illinois State Water Survey Urbana
E. A. Mueller, and A. L. Sims. Mar 67, 98p
ECOM-02071-RR1
Contracts DA-28-043-AMC-02071 (E), DA-36-039-sc-75055
Continuation of contracts DA-36-039-sc-87280, and DA-28-043-AMC-00032 (E).

Descriptors: (*Raindrops, Marshall Islands), (*Atmospheric precipitation, Tropical regions), Particle size, Sampling, Tables, Water, Attenuation, Distribution, Volume, Radar reflections, Rainfall, Photographic analysis, Computers.

Raindrop size distributions are presented in a tabular form for 2660 samples of one cubic meter each. These were obtained from a drop camera on the Majuro Atoll of the Marshall Islands during the period of March 11, 1959 through April 29, 1960. For each of the samples, certain parameters calculated from the distribution are reported. These include rainfall rate, radar reflectivity, liquid water content, attenuation cross-section, median volume diameter, and the total number of drops. Thirty-four average distributions for various rainfall rates are also reported.
AD-650 913 HC$3.00 MF$0.65

AN INVESTIGATION OF HUMAN PROCESSING OF INFORMATION IN WEATHER FORECASTING.
Final rept., 15 May 65-14 Nov 66,
Sylvania Electronic Systems-East Waltham Mass Applied Research Lab
Donald B. Devoe. Jan 67, 152p Rept no. F-5151-1
ESD-TR-67-218
Contract AF 19 (628)-5176

Descriptors: (*Weather forecasting, Systems engineering), (*Man-machine systems, Weather stations), Data processing systems, Simulation, Display systems, Human engineering, Effectiveness, Decision making.

As an approach to the analysis of human functions in complex systems, techniques were devised and tested for analyzing information processing by weather forecasters. The field interview as a source of information on the utilization of centrally-prepared aids to forecasting was evaluated at two Air Force Weather stations. The presentation of weather information via a forecaster's console was simulated in the laboratory and tested experimentally both as a means for analyzing information processing by forecasters and as a test bed for evaluating new approaches to the display of weather information. The results of the interviews and the experiment are discussed regarding their implications for weather forecasting and for research methodology, and further studies are recommended.
AD-650 918 HC$3.00 MF$0.65

A STOCHASTIC MODEL OF THE FREQUENCY AND DURATION OF WEATHER EVENTS,
Environmental research papers no. 264,
Air Force Cambridge Research Labs L G Hanscom Field Mass
Irving I. Gringorten. 8 Apr 66, 90p Rept no. AFCRL-67-0125
Availability: Published in Journal of Applied Meteorology v5 n5 p606-24 Oct 1966.

Descriptors: (*Stochastic processes, *Weather), Climatology, Monte Carlo method, Probability, Periodic variations, Frequency shift, Atmospheric

precipitation, Mathematical models, Tables, Atmospheric temperature, Graphics.

A simple Markov chain has been demonstrated to be a potentially useful device for making estimates of the frequencies and durations, from several hours to several weeks, of a large variety of weather events. In order to answer the practical questions, it was found necessary to simulate probability distributions by a Monte Carlo exercise. The resulting eight sets of charts have wide applicability. (Author)
AD-650 947 Not available from CFSTI.

DEUTERIUM AND OXYGEN 18 VARIATIONS IN THE OCEAN AND THE MARINE ATMOSPHERE.
Scripps Institution of Oceanography La Jolla Calif
For primary bibliographic entry see Field 8C.
AD-650 965 Not available from CFSTI.

PREDICTION AND MAINTENANCE OF RADIATION FOG.
Utah Univ Salt Lake City
For primary bibliographic entry see Field 4A.
AD-651 115 HC$3.00 MF$0.65

REMOTE SENSING BY INFRARED AND MICROWAVE RADIOMETRY. I. BASIC PRINCIPLES. II. A TECHNIQUE FOR THE CORRECTION OF AIRBORNE MEASUREMENTS OF APPARENT SURFACE TEMPERATURE OF NATURAL WATER BODIES. III. POTENTIAL APPLICATIONS OF INFRARED AND MICROWAVE RADIOMETRY.
Wisconsin Univ Madison Dept of Meteorology
For primary bibliographic entry see Field 14B.
AD-651 188 HC$3.00 MF$0.65

UPPER ATMOSPHERE PRESSURE MEASUREMENTS WITH THERMAL CONDUCTIVITY GAUGES,
Atmospheric Sciences Lab White Sands Missile Range N Mex
Otto W. Thiele, and Norman J. Beyers. Jan 67, 35p
ECOM-5110

Descriptors: (*Upper atmosphere, Pressure), Thermal conductivity, Meters, Thermistors, Stratosphere, Diurnal variations, Rockets, Meteorological parameters, Subsonic characteristics, Temperature.

Recent studies of meteorological rocket data have shown a significant diurnal variation of temperature, pressure and density in the stratopause region; however, some doubts have been expressed concerning possible effects on the bead thermistor sensing system which may contribute to the large diurnal changes previously observed. While all known effects have been accounted for and no evidence to the contrary has been offered, it seemed worthwhile to investigate this possibility with an independent system which would not be subject to the external effects encountered by the exposed bead thermistor as employed with standard rocketsondes. Consequently, two pressure soundings, between approximately 30 and 60 km were obtained with thermal conductivity gauges which were incorporated with standard rocketsondes. The thermal conductivity gauges were found to be very efficient and reliable in the low subsonic regime encountered with parachute-suspended sounding systems, and good agreement was obtained between the computed and measured pressure and also between the computed and measured temperature. (Author)
AD-651 216 HC$3.00 MF$0.65

INSTRUMENTS AND METHODS FOR METEOROLOGICAL OBSERVATIONS.
Israel Program for Scientific Translations, Ltd., Jerusalem.
M. S. Sternzat. 1966, 494p TT-65-50004
Transl. Into English of the Book "pribory I Metody Nablyudenii" Leningrad, Meteorol. Izd., 1963 Proc. of the All-union Meteorol. Conf., Vol. Ix Published for Commerce Dept. and Nsf

Descriptors: *Automation, *Conference, *Data processing, *Hydrometeorology, *Meteorological instrument, Analysis, Atmospheric, Data, Error, Instrument, Measurement, Meteorology, Observation, Processing, Radiosonde, Sounding, Station, U.S.S.R..

For abstract, see STAR 05 11.
N67-21984 HC$3.00 MF$0.65

PYRHELIOMETRIC COMPARISONS AT THE JPL TABLE MOUNTAIN FACILITY.
Eppley Lab., Inc., Newport, R. I. Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
A. J. Drummond, and E. G. Laue. 15 Dec 66, 12p NASA-CR-83271, JPL-TM-33-312
Contract NAS7-100
Prepared Jointly With Jpl

Descriptors: *Actinometry, *Calibration, *Sunlight, Apparatus, Electric, Equipment, Instrumentation, Measuring, Radiation, Solar.

For abstract, see STAR 05 11.
N67-22061 HC$3.00 MF$0.65

PRACTICAL UTILIZATION OF DATA OF METEOROLOGICAL SATELLITES.
Volt Technical Corp., Washington, D. C.
E. P. Borisenkov, K. YA.Kondratyev, and A. A. Morozkin. 14 Feb 67, 10p NASA-CR-83393, TTC-AM-10563
Contract NAS5-12487
Center, 14 Feb. 1967 10 P Transl. Into English From the Book "prakticheskoye Ispol'zovaniye Dannykh Meteorologicheskikh Sputnikov" Moscow, Gidrometeoizdat., 1966

Descriptors: *Data analysis, *Meteorological satellite, Analysis, Cloud, Content, Data, Figure, Interpretation, Observation, Photograph, Radiation, Satellite, Table, Utilization.

For abstract, see STAR 05 11.
N67-22437 HC$3.00 MF$0.65

MONTHLY MEAN CHARTS OF THE 20-MB. CONSTANT PRESSURE SURFACE OVER THE ANTARCTIC REGION: JANUARY 1962-THROUGH DECEMBER 1964.
Technical memo.,
Polar Meteorological Group, Silver Spring, Md.
Herbert J. Viebrock.Feb 67, 47p IERTM-POLAR-1

Descriptors: (*Antarctic regions, Barometric pressure), (*Atmospheric motion, Antarctic regions), Atmospheric temperature, Stratosphere, Meteorological charts, Polar regions.

A set of 36 monthly mean charts for the 20-mb. level over the Antarctic Region has been prepared and briefly described. The data sources and evaluation are mentioned. A fully developed winter pattern exists from April to September, while there is a relatively short-lived weak summer circulation in December and January. February-March and October-November are the transition periods and the mean patterns of the individual months vary from year to year. (Author)
PB-174 498 HC$3.00 MF$0.65

AN EXPERIMENT IN THE USE OF THE BALANCE EQUATION IN THE TROPICS,
Weather Bureau, Silver Spring, Md. Techniques Development Lab.
M. A. Alaka, D. T. Rubsam, and G. E. Fisher.
Mar 67, 25p
WBTM-TDL-8
Prepared in cooperation with Institutes for Environmental Research, Miami, Fla.

Descriptors: (*Hurricane tracking, *Equations of motion), Tropical cyclones, Wind, Pressure, Storms, Weather forecasting.

The balance equation is used to generate the geopotential height fields from the wind fields at 850, 500 and 200 millibars during the development of hurricane Carla (1961). The results show that, although the generated heights are consistently lower than the reported heights, the differences are within the range of instrumental errors, even at 200 millibars where strong divergence occurs in connection with outflow from the storm. Comparison of the 200-mb contours generated by the balance equation with those obtained by including the divergence term shows that the latter heights exceed the former by up to 80 ft. The maximum differences, predictably, are found where the highest values of the divergence occur. (Author)
PB-174 501 HC$3.00 MF$0.65

A CASE STUDY OF CLEAR-AIR TURBULENCE IN THE MIDWEST.
Final rept., 1 Mar 66-28 Feb 67,
Pennsylvania State Univ., University Park.
Kurt H. Hemmerich.31 Mar 67, 29p
Contract Cwb-11308

Descriptors: (*Atmospheric motion, *Clear air turbulence), Airplanes, Turbulence, Radioactive fallout, Sampling, Meteorological parameters, Numerical methods and procedures, Flight paths, Tables.

During flights on April 23-24, 1963, in the Dayton-Flint area, two airplanes sampling radioactive debris encountered moderate and severe turbulence. Because these planes also recorded temperature and wind, it was possible to obtain more detailed analysis of vertical cross sections than is usually the case. All the reports of CAT occurred in a strongly baroclinic layer, in which Richardson number of 0.5 is consistent with the turbulence reports. There is strong indication that the most severe CAT occurred at the edges of the internal front. (Author)
PB-174 533 HC$3.00 MF$0.65

THE ROLE OF PERSISTENCE, INSTABILITY, AND MOISTURE IN THE INTENSE RAINSTORMS IN EASTERN COLORADO, JUNE 14-17, 1965.
Technical memo.,
Weather Bureau, Washington, D. C. Office of Hydrology.
F. K. Schwarz. Feb 67, 24p WBTM HYDRO-3

Descriptors: (*Storms, *Floods), (*Weather forecasting, *Rain), Atmosphere, Humidity, Stability, Intensity, Meteorological parameters, Atmospheric sounding, Meteorological phenomena, Colorado.

Heavy rains in eastern Colorado June 14-17, 1965 caused widespread flooding including the greatest flood of record in Denver. A persistent rain-favoring flow pattern over a restricted area provided the framework for these rains. Moisture and instability in this flow are evaluated and implications to forecasting discussed. (Author)
PB-174 609 HC$3.00 MF$0.65

TIROS CLOUD FREE ATLAS: NORTH AMERICA CENTRAL UNITED STATES SPRING SEASON,
Bohan (Walter A.) Co., Park Ridge, Ill.
Robert W. Popham, and Maurice Baliles. Jan 67, 30p
Prepared in cooperation with National Environ-

mental Satellite Center, Washington, D.C. See also PB-174 611 and PB-174 612.

Descriptors: (*Meteorological satellites, *Maps), (*Aerial photographs, Meteorological satellites), Meteorological parameters, Aerial photography, Photointerpretation, Periodic variations, Meteorological charts, Northern Hemisphere, United States, Canada, Mexico.
Identifiers: Tiros.

The Tiros Cloud Free Atlas is one of a series of three atlases to be published containing essentially cloud free satellite photographs of the United States and contiguous areas of Canada and Mexico. The atlases have been compiled primarily for use at meteorological stations within the continental U.S. capable of receiving pictures from satellites equipped with automatic picture transmission (APT) systems. They are intended for use as a guide in training meteorological personnel to recognize those surface features which might otherwise be interpreted as clouds. (Author)
PB-174 610 HC$3.00 MF$0.65

TIROS CLOUD FREE ATLAS: NORTH AMERICA EASTERN UNITED STATES SPRING SEASON,
Bohan (Walter A.) Co., Park Ridge, Ill.
Robert W. Popham, and Maurice Baliles. Jan 67, 42p
Prepared in cooperation with National Environmental Satellite Center, Washington, D.C. See also PB-174 610 and PB-174 612.

Descriptors: (*Meteorological satellites, *Maps), (*Aerial photographs, Meteorological satellites), Meteorological parameters, Aerial photography, Periodic variations, Meteorological charts, Clouds, Photointerpretation, United States, Canada, Mexico.
Identifiers: Tiros.

The Tiros Cloud Free Atlas is one of a series of three atlases to be published containing essentially cloud free satellite photographs of the United States and contiguous areas of Canada and Mexico. The atlases have been compiled primarily for use at meteorological stations within the continental U.S. capable of receiving pictures from satellites equipped with automatic picture transmission (APT) systems. They are intended for use as a guide in training meteorological personnel to recognize those surface features which might otherwise be interpreted as clouds. (Author)
PB-174 611 HC$3.00 MF$0.65

TIROS CLOUD FREE ATLAS: NORTH AMERICA WESTERN UNITED STATES SPRING SEASON,
Bohan (Walter A.) Co., Park Ridge, Ill.
R. W. Popham, and M. Baliles. Dec 66, 53p
Prepared in cooperation with National Environmental Satellite Center, Washington, D. C.. See also PB-174 611 and PB-174 610.

Descriptors: (*Meteorological satellites, *Maps), (*Aerial photographs, Meteorological satellites), Photointerpretation, Periodic variations, Meteorological charts, Northern Hemisphere, Meteorological parameters, United States, Canada, Mexico.
Identifiers: Tiros.

The Tiros Cloud Free Atlas is one of a series of three atlases to be published containing essentially cloud free satellite photographs of the United States and contiguous areas of Canada and Mexico. The atlases have been compiled primarily for use at meteorological stations within the continental U.S. capable of receiving pictures from satellites equipped with automatic picture transmission (APT) systems. They are intended for use as a guide in training meteorological personnel to recognize those surface features which might otherwise be interpreted as clouds. (Author)
PB-174 612 HC$3.00 MF$0.65

5. BEHAVIORAL AND SOCIAL SCIENCES

5A. ADMINISTRATION AND MANAGEMENT

SOME NETWORK CHARACTERIZATIONS FOR MATHEMATICAL PROGRAMMING AND ACCOUNTING APPROACHES TO PLANNING AND CONTROL,
Carnegie Inst of Tech Pittsburgh Pa Management Sciences Research Group
A. Charnes, and W. W. Cooper. 1967, 31p
Confract Nonr-760 (24)
Prepared in cooperation with Northwestern Univ., Evanston, Ill. under contracts Nonr-1228 (10), and DA-31-124-ARO (D)-322. Prepared for presentation at American Accounting Association, annual meeting, 1966.
Availability: Published in The Accounting Review v42 p24-52 Jan 1967.

Descriptors: (*Management planning, *Mathematical programming), (*Management control systems, *Linear programming), Operations research, Probability, Management engineering, Differential geometry, Optimization, Electrical networks, Cost effectiveness, Costs.

Network characterizations are developed for effecting contacts between accounting and mathematical programming. En route to these objectives some of the customary uses of double entry accounting are altered and related to suitable generalizations of classical network ideas such as the Kirchhoff node conservation laws. Extensions of the usual node-link incidence relations provide a basis for effecting these contacts. Concrete illustrations are supplied including a goods-flow-funds-flow model which is preceded by a simpler example involving a PERT-Critical Path application. The latter is examined in the context of a physical flow of task or project times, while the former suggests how double entry can be extended to flows that involve a variety of different dimensions. Issues of accounting in different dimensions are thus examined and further issues of accounting for multiple objectives in different and even noncommensurable measures are also indicated. A possibility for joint coordinated uses of programming and accounting in management planning is indicated and amplified and some of the implications for alterations in accounting practice are then examined. Suggestions for further extensions include probabilistic formulations and related risk considerations and evaluations. In an addendum the node-link incidences are further related to node-node incidences in the context of dyadic representations such as are encountered in the transportation type models of linear programming or the spread sheets and articulation statements of double-entry accounting.
AD-650 613 Not available from CFSTI.

CLASSIFICATION MANAGEMENT AT SYSTEM DEVELOPMENT CORPORATION.
Professional paper,
System Development Corp Santa Monica Calif
L. F. McConnell. 10 Mar 66, 28p Rept no. SP-2388
Presented at the USAF Air Force Systems Command Conference on Classification Management, held at Cocoa Beach, Fla., 14-18 Mar 66.

Descriptors: (*Classification, Management control systems), Documentation, Organizations, Decision making, Technical information centers, Information retrieval, Systems engineering, Effectiveness.

The classification management function at SDC is the responsibility of a staff Office, 'Classification Management and Editorial Liaison.' The CM and EL Office functions include providing classification guidance, reviewing group assignment, establishing control stations, providing accountability control procedures, conducting downgrading reviews, handling disposition of classified information upon termination of contracts, clearing documents for public release, approving release, providing publication procedures, and developing statistics. (Author)
AD-650 664 HC$3.00 MF$0.65

COMPARISON OF RANK CORRELATIONS CONCERNING SALARY, SIZE OF STAFF AND DEGREE LEVEL.
Office of the Director of Defense Research and Engineering Washington D C
For primary bibliographic entry see Field 51.
AD-650 665 HC$3.00 MF$0.65

AN APPROACH TO ESTIMATING THE COST OF THE PROPOSAL TO RAISE ALLOWANCES OF HIGH-GRADE POSITIONS FOR DoD LABORATORIES.
Office of the Director of Defense Research and Engineering Washington D C
For primary bibliographic entry see Field 51.
AD-650 666 HC$3.00 MF$0.65

THEORETICAL ANALYSIS OF IMPACT ON OPERATIONAL EFFECTIVENESS BY CONTROL OF HIGH GRADES, AVERAGE SALARY AND MANPOWER SPACES.
Office of the Director of Defense Research and Engineering Washington D C
For primary bibliographic entry see Field 51.
AD-650 667 HC$3.00 MF$0.65

LOGISTICS INFORMATION SYSTEMS.
George Washington Univ Washington D C Logistics Research Project
For primary bibliographic entry see Field 15E.
AD-650 748 HC$3.00 MF$0.65

OPTIMAL CONTINUOUS REVIEW POLICIES FOR TWO PRODUCT INVENTORY SYSTEMS WITH JOINT SETUP COSTS.
Technical rept.,
Columbia Univ New York Operations Research Group
Edward Ignall. 15 Dec 66, 27p Rept no. TR-35
Contract Nonr-266 (55)

Descriptors: (*Management engineering, *Inventory), (*Inventory control, *Costs), Operations research, Probability, Value engineering, Random variables, Replacement theory, Statistical processes, Inventory analysis, Mathematical programming.

Minimum average cost ordering policies for continuously reviewed two product inventory systems with joint setup costs are sought. Disappointingly, the optimal policy, even in a simple symmetric case, is not always simple: For some values of cost and demand parameters, a policy that would be difficult to implement is optimal. Markov Renewal Programming is used to find the region in parameter space where a given policy is optimal.
AD-650 793 HC$3.00 MF$0.65

BIBLIOGRAPHY ON COST-BENEFIT ANALYSIS AND PLANNING-PROGRAMMING-BUDGETING,
Research Analysis Corp Mclean Va
Elizabeth H. Pearman. 8 Feb 66, 47p

Descriptors: (*Cost effectiveness, *Management engineering), Defense systems, Education, Sociology, Bibliographies, Documentation, Urban planning, Transportation, Natural resources.

The bibliography was prepared in connection with the Research Analysis Corporation's work in prin-

ciples of cost-effectiveness analysis, cost-benefit analysis and planning-programming-budgeting. This listing is not intended to be exhaustive, but meant to serve as an introduction to the rapidly expanding body of literature. Most of the entries are unclassified. The citations are arranged by broad subject categories and alphabetically by author within these classifications. The material was obtained from references provided in individual documents and in published bibliographies.
AD-650 904 HC$3.00 MF$0.65

CONSUMER BEHAVIOR AND WORKER PARTICIPATION IN RECOVERY ACTIVITIES,
Human Sciences Research Inc Mclean Va 4710
For primary bibliographic entry see Field 15C.
AD-651 098 HC$3.00 MF$0.65

RESETTLEMENT IN LATIN AMERICA: AN ANALYSIS OF 35 CASES,
American Univ Washington D C Center for Research in Social Systems
Milton Jacobs, Alexander R. Askenasy, and Norita P. Scott. Apr 67, 55p
Contract DA-49-092-ARO-7

Descriptors: (*Management planning, Latin America), (*Government (Foreign), Economics), United States government, Agriculture, Military training, Population, Political science, Social sciences, Rural areas, Education, Medicine, Housing, Federal budgets.

A study of agricultural settlements (or colonies) in Latin America: the history of settlement, current governmental efforts in colonization, and an analysis of the colonies in terms of success or failure are included. Detailed description of five of the settlements is appended.
AD-651 116 HC$3.00 MF$0.65

URANIUM PRICE SCHEDULES BY UCOST CODE COMPUTATION,
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
D. E. Deonigi, P. A. Horton, and J. H. Nail. Sep 66, 168p
Contract AT (45-1)-1830

Descriptors: (*Management engineering, *Scheduling), Uranium, Costs, Tables, Separation, Programming (Computers).

For abstract, see NSA 21 09.
BNWL-312 HC$3.00 MF$0.65

FIRST ANNUAL LOGISTICS MANAGEMENT SYMPOSIUM, SEPTEMBER 13 AND 14, 1966.
National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala. 16 Jan 67, 126p NASA-TM-X-53566

Descriptors: *Conference, *Logistics, *Management planning, *Program management, *Support system, Aircraft, Apollo project, Armed forces, Asia, Cape kennedy, Cargo, Contract, Design, East, Education, Engineering, Facility, Government, Hardware, Industry, Integration, Management, Minuteman icbm, Nasa program, Personnel, Philosophy, Planning, Procurement, Program, Saturn v launch vehicle, South, Support, System, Transportation, Weapon.

For abstract, see STAR 05 11.
N67-21962 HC$3.00 MF$0.65

THE DISTRIBUTION OF GROSS BENEFITS OF PRESENT FEDERAL WELFARE AND INCOME MAINTENANCE PROGRAMS,
Institute for Defense Analyses, Arlington, Va. Economic and Political Studies Div.
Neil S. Weiner. Feb 66, 56p Rept. nos. Study-S-245, IDA/HQ-66-5479
Prepared in cooperation with the Office of Economic Opportunity.

Descriptors: (*Federal budgets, Distribution (Economics)), Economics, Agriculture, Housing, Costs, Effectiveness.
Identifiers: Welfare economics, Poverty.

The aim of the study is to weigh the direct contribution of current Federal welfare and income maintenance programs to the income of the poor. For the most part, this effort does not concern itself with who actually bears the cost of a program or with redistributive aspects, but on the distribution of benefits. A surprisingly small percentage of current Federal programs benefit the poor. The analysis seems to suggest that these programs, as they now stand, do not offer any great prospects of alleviating poverty on a substantial scale.
PB-174 445 HC$3.00 MF$0.65

UTILIZING A COLLEGE'S RESOURCES TO PROVIDE MANAGEMENT ASSISTANCE TO BUSINESS FIRMS IN SOUTHERN WEST VIRGINIA.
Rept. for 1 Jul 63-30 Jun 66.
Concord Coll., Athens, W. Va. Center for Economic Action.

Mar 67, 68p
Contract Cc-6019
Prepared in cooperation with Economic Development Administration, Washington, D. C.

Descriptors: (*Management planning, *Universities), Economics, Rural areas, Commerce, Management engineering, Maps, West Virginia, Industrial production.

The Concord College Center for Economic Action was established in June 1963 to provide managerial assistance to independent business firms in a ten-county area in southern West Virginia. It was designed as an experimental program to utilize the resources of Concord College, and other educational institutions in the area, to provide small independent firms with assistance in improving management and production methods, personnel procedures, marketing opportunities, and accounting methods. The Center's program provided small independent business firms with: a consultation service; sources of information on methods of financing, new marketing opportunities, and various types of assistance available to area business firms from other agencies and associations; management training programs; and aid in strengthening regional industrial associations. (Author)
PB-174 471 HC$3.00 MF$0.65

RELATION OF THE IDEA FLOW STUDY TO OTHER RESEARCH ON R AND D ORGANIZATION,
Northwestern Univ., Evanston, Ill. Dept. of Industrial Engineering and Management Sciences.
For primary bibliographic entry see Field 5I.
PB-174 522 HC$3.00 MF$0.65

5B. DOCUMENTATION AND INFORMATION TECHNOLOGY

AN EXPERIMENTAL SYSTEM FOR THE EXCHANGE OF SCIENTIFIC INFORMATION,
IBM Watson Research Center, Yorktown Heights, N. Y.
E. Wong, and M. Kochen. Dec 62, 26p

Descriptors: (*Documentation, *Group dynamics), Probability, Abstracts, Collecting methods, Game theory, Groups (Mathematics), Identification, Mathematical analysis, Matrix algebra, Reading, Selection, Statistical analysis, Statistical distributions, Tests, Data.

In the face of rapid increases in the number of published journals, mostly in areas of high specialization, it is becoming increasingly difficult for an individual to discover items of potential value without an enormously increased reading load. The situation is even worse for items in unexpected or unknown sources. To a certain extent the problem of finding rare items is automatically alleviated in practice by extensive information exchanges among scientists with similar interests. Similarity in interests leads to 'cliques' or 'clusters' within which channels for efficient information exchange exist. The primary goal of the system being considered here is to discover, formalize, and utilize these clusters for the purpose of increasing the likelihood of discovering a rare item of information for an individual. This system of exchange through clustering has several distinct attractive features. First, since items distributed are 'rare' items, the amount of information of minor interest or no interest at all to a participant is kept to a minimum. Secondly, since this is a system of exchange, the task of administering such a program is kept simple. This paper describes the design of the system, formation of clusters, and analysis of some preliminary performance data. (Author)
AD-297 278 HC$3.00

THE NAVY AUTOMATED RESEARCH AND DEVELOPMENT INFORMATION SYSTEM (NARDIS).
Progress rept. for Jul 65,
David Taylor Model Basin Washington D C Applied Mathematics Lab
Gilbert R. Gray, Thomas A. Duckenfield, and Joseph L. Fuchs. Aug 65, 19p
DTMB-2103

Descriptors: (*Naval research, *Information retrieval), (*Data processing systems, Naval research), Data storage systems, Subject indexing, Scientific research, Computers, Automatic, Management engineering, Data.
Identifiers: NARDIS, Research and development.

The Navy Automated Research and Development Information System (NARDIS) was established under the direction of the Chief of Naval Research with funds from the Office of Naval Research, the Bureau of Ships, and the Bureau of Naval Weapons. The basic objective of NARDIS is to establish and maintain a common data bank of scientific, technical and administrative information on all Navy-sponsored research and development. This data bank may be used as a prime source of RDT+E information by all military, management, scientific, and technical echelons of the Navy. The report is a summary of the NARDIS system and the progress made during the implementation period of January to July, 1965. (Author)
AD-650 570 HC$3.00 MF$0.65

SURVEY OF AUTOMATIC DIGITAL PLOTTERS.
David Taylor Model Basin Washington D C Applied Mathematics Lab
For primary bibliographic entry see Field 9B.
AD-650 592 HC$3.00 MF$0.65

THE ELECTRONIC INSTALLATION RECORD SYSTEM PROBLEM.
David Taylor Model Basin Washington D C Applied Mathematics Lab
For primary bibliographic entry see Field 9B.
AD-650 593 HC$3.00 MF$0.65

DOCUMENTATION TECHNIQUES FOR DIGITAL COMPUTERS.
Military Academy West Point N Y Dept of Electricity
For primary bibliographic entry see Field 9B.
AD-650 645 HC$3.00 MF$0.65

LOGISTICS INFORMATION SYSTEMS.
George Washington Univ Washington D C Logistics Research Project
For primary bibliographic entry see Field 15E.
AD-650 748 HC$3.00 MF$0.65

AN ANNOTATED BIBLIOGRAPHY OF METEOROLOGICAL TOWER AND MAST STUDIES - WB/BS-5,
Environmental Science Services Administration Silver Spring Md Environmental Data Services
For primary bibliographic entry see Field 4B.
AD-650 781 HC$3.00 MF$0.65

SYSTEM DEVELOPMENT PLAN FOR A NATIONAL CHEMICAL INFORMATION SYSTEM.
Information Management Inc Burlington Mass
Apr 67, 35p
Contract NSF-C-463
See also AD-650 901.

Descriptors: (*Data processing systems, Management planning), (*Chemistry, *Documentation), Management control systems, Specifications, Technical information centers, Information retrieval, Computers, Systems engineering, Manpower, Costs.
Identifiers: Information systems.

The document identifies policy decisions which must be made, suggests methods of funding, describes work to be done, provides costs of manpower and equipment and delineates steps for implementing the National Chemical Information System. One of the first steps required is the approval or modification of this plan. It then becomes a guideline for development. (Author)
AD-650 900 HC$3.00 MF$0.65

SYSTEM PERFORMANCE SPECIFICATION FOR A NATIONAL CHEMICAL INFORMATION SYSTEM.
Information Management Inc Burlington Mass
Apr 67, 129p
Contract NSF-C-463
See also AD-650 900.

Descriptors: (*Data processing systems, Management planning), (*Chemistry, *Documentation), Management control systems, Specifications, Technical information centers, Information retrieval, Computers, Systems engineering, Manpower, Costs.
Identifiers: Information systems.

The document contains a set of statements about information needs, system goals, system requirements and system specifications for the development of a National Chemical Information System. In its present form, the document constitutes a basis for future planning. As policy decisions are made, technical problems solved and plans are altered the resultant changes must be reflected in the specifications. In this sense, the System Performance Specification cannot be complete until the system is operational. (Author)
AD-650 901 HC$3.00 MF$0.65

BIBLIOGRAPHY ON COST-BENEFIT ANALYSIS AND PLANNING-PROGRAMMING-BUDGETING,
Research Analysis Corp Mclean Va
For primary bibliographic entry see Field 5A.
AD-650 904 HC$3.00 MF$0.65

STUDENT INDEXER TRAINING PROGRAM AND THE IMPROVED OPERATION OF A DOCUMENT RETRIEVAL SYSTEM.
Final summary rept., 1 Dec 65-30 Nov 66,
Dayton Univ Ohio Research Inst
Frederic L. Scheffler. Jan 67, 57p
AFML-TR-66-391
Contract AF 33 (615)-3389

Descriptors: (*Subject indexing, Training), (*Information retrieval, Effectiveness), Students, Documentation, Reports, Vocabulary.

The availability of students at the University of Dayton had suggested their possible use as indexers for indexing documents for the Aerospace Materials Information Center (AMIC). A student had been employed two years ago and informally trained in indexing. The success of that experience, the successful development of a controlled vocabulary, and the need for additional indexers led to the inauguration of a formal indexer training program for upperclassmen. The design, implementation and evaluation of the training program are described. It was concluded that students can become proficient indexers. Modifications were made to improve the various operations of the retrieval system: the AMIC system was transferred from the University's NCR 304 computer to the government's IBM 7094 computer facilities at WPAFB; modifications were made in the vocabulary and the saurus to make them easier to use and to save professional time; microfilm equipment was installed to increase the efficiency of screening search outputs. Additional studies have commenced which will lead to furthering the efficiency and effectiveness of the overall system. (Author)
AD-651 039 HC$3.00 MF$0.65

THESES AND DISSERTATIONS IN THE HOLDINGS OF THE ARMY LIBRARY. THIRD REVISED EDITION.
Army Library Washington D C
May 66, 105p Rept no. Special Bibliography-20-Rev-3

Descriptors: (*Scientific research, Bibliographies), (*Theses, Libraries), Management engineering, Military tactics, Armed forces operations, Social sciences, Economics, Education, History, Political science, Psychology, Geophysics, Army.

The bibliography contains 836 theses and dissertations ranging by subject from military arts and sciences through social and physical sciences and the humanities.
AD-651 164 HC$3.00 MF$0.65

AUTOMATIC TYPOGRAPHIC-QUALITY TYPESETTING TECHNIQUES: A STATE-OF-THE-ART REVIEW,
National Bureau of Standards, Washington, D. C. Center for Computer Sciences and Technology.
For primary bibliographic entry see Field 14E.
NBS-Mono-99 HC$0.70 MF$0.65

A REQUEST ORIENTED INFORMATION SELECTION PROGRAM.
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
E. Ryan. Apr 67, 44p NASA-TN-D-3924
Contract 125-23-02-10-22

Descriptors: *Computer program, *Data retrieval, *Information retrieval, Algorithm, Computer, Data, Description, Document, Fixed, Format, Fortran, General, Information, Input, Internal, Output, Program, Purpose, Retrieval.

For abstract, see STAR 05 11.
N67-22871 HC$3.00 MF$0.65

MANAGEMENT OF CONTRACTOR DATA AND REPORTS. VOLUME II: AUTHORIZED DATA LIST.
Air Force Systems Command, Washington, D.C.
3 Apr 67, 177p AFSCM/AFLCM-310-1H-Vol-2
See also PB-172 870-A through PB-172 870-G.

Descriptors: (*Data, Processing), (*Reports, Processing), Costs, Documentation, Management control systems, Military requirements, Instruction manuals.
Identifiers: Data forms.

The report contains the approved AFLC/AFSC Forms 9 'Data Item' which are authorized for possible use in a Contractor Data Requirements List.
PB-172 870-H HC$3.00

PACIFIC SALMON LITERATURE COMPILATION--1900-1959. INSTRUCTIONS AND INDEX,
Bureau of Commercial Fisheries, Seattle, Wash. Biological Lab.
For primary bibliographic entry see Field 6C.
PB-174 101 HC$3.00 MF$0.65

PACIFIC SALMON LITERATURE COMPILATION--1900-1959. MICROFICHE SET,
Bureau of Commercial Fisheries, Seattle, Wash. Biological Lab.
For primary bibliographic entry see Field 6C.
PB-174 102 MF$0.65

ANNOTATED BIBLIOGRAPHY OF WALNUT AND RELATED SPECIES.
North Central Forest Experiment Station, St. Paul, Minn.
For primary bibliographic entry see Field 2F.
PB-174 509 HC$3.00 MF$0.65

A CONSOLE SYSTEM FOR TEXT MANIPULATION AND PAGE COMPOSITION.
Progress rept. no. 13,
Bunker-Ramo Corp., Canoga Park, Calif.
Gerhard Reitz, and Wade L. White. 20 Mar 67, 131p D199-7U2
Contract NSF-C372
Rept. on Computer-Aided Research in Machine Translation. See also PB-174 534.

Descriptors: (*Machine translation, Display systems), Corrections, Input-output devices, Automatic, Computer programs.
Identifiers: Edit-layout.

For purposes of post-editing machine translated text, a display system called EDIT-LAYOUT was developed which allows complete freedom in manipulation of the input text, i.e., in recasting, correcting, or rejecting words or sentences and, also, opening space for equations, graphics, or other material which could not be input. The system allows a variable number of characters per line and a variable number of lines per page. Pagination and page headings are automatically inserted. Although this system was developed for post-editing, it is, with the exception of a very few functions, independent of this application and could be used generally for text manipulation. Although some functions have not yet been implemented, the program is debugged and working. (Author)
PB-174 518 HC$3.00 MF$0.65

COMPUTER-AIDED RESEARCH IN MACHINE TRANSLATION.
Final rept.
Bunker-Ramo Corp., Canoga Park, Calif. Defense Systems Div.
31 Mar 67, 277p D199-7U4
Contract NSF-C372
See also PB-174 518.

Descriptors: (*Machine translation, Computer programs), Dictionaries, Russian language, Syntax, English language, Errors, Information retrieval, Documentation.

The report deals with the history of machine translation at Ramo-Wooldridge, a predecessor compa-

ny of The Bunker-Ramo Corporation, with the outlook and development of work done under this NSF contract and its relation to other contracts. All machine programs not previously reported, as well as the disposition of materials, are described in detail. (Author)
PB-174 534 HC$3.00 MF$0.65

A LEXEMIC DICTIONARY: GOALS AND PROCEDURE DEI,
California Univ., Berkeley. Machine Translation Project.
For primary bibliographic entry see Field 5G.
PB-174 556 HC$3.00 MF$0.65

PROGRAM DESCRIPTION THE LOOKUP ADAPTOR (LADAPT) P3 (DLA),
California Univ., Berkeley. Machine Translation Project.
Regina Frey.Jan 67, 50p
Grant NSF-GN-306

Descriptors: (*Machine translation, *Computer programs), Decoding, Operation, Dictionaries, Input-output devices, Russian language, English language, Data processing systems, Errors.
Identifiers: LADAPT.

The report provides, in programming terms, a detailed description of the Lookup Dictionary Adaptor Program (LADAPT). The information presented is divided into four main catagories - program operation, data organization, descriptions of the program itself, and the error procedures. Anyone who has written a morphology and wishes only to execute the program as part of the process of morphological decoding will find sufficient information in the Operation and Error Procedures sections. (Author)
PB-174 558 HC$3.00 MF$0.65

PROGRAM DESCRIPTION THE LOOKUP DICTIONARY PRINT PROGRAM (LPRINT) P4 (DPP),
California Univ., Berkeley. Machine Translation Project.
Regina Frey. Feb 67, 18p
Grant NSF-GN-306

Descriptors: (*Machine translation, *Computer programs), Dictionaries, Documentation, Operation, Data processing systems, Errors, Decoding, Programming languages.
Identifiers: LPRINT.

The report provides, in programming terms, a detailed description of the Lookup Dictionary Print Program (LPRINT). The information presented is divided into four main catagories - program operation, data organization, descriptions of the program itself, and the error procedures. Anyone who has written a morphology and wishes only to execute the program as part of the process of morphological decoding will find sufficient information in the Operation and Error Procedures sections. (Author)
PB-174 559 HC$3.00 MF$0.65

A FINAL ADMINISTRATIVE REPORT,
California Univ., Berkeley. Machine Translation Project.
For primary bibliographic entry see Field 5G.
PB-174 560 HC$3.00 MF$0.65

PROGRAM DESCRIPTION THE LOOKUP PROGRAM (LOOKUP) P5 (DLP),
California Univ., Berkeley. Machine Translation Project.
Regina Frey. Nov 66, 67p
Grant NSF-GN-306

Descriptors: (*Machine translation, Computer programs), Operation, Data processing systems, Errors, Algorithms, Input-output devices, Dictionaries.
Identifiers: Lookup.

The report provides, in programming terms, a detailed description of the Lookup Program (LOOKUP). The information presented is divided into four main catagoriesprogram operation, data organization, descriptions of the program itself, and the error procedures. Anyone who has written a morphology and wished only to execute the program as part of the process of morphological decoding will find sufficient information in the Operation and Error Procedure sections. (Author)
PB-174 561 HC$3.00 MF$0.65

PHYSICAL PROPERTIES OF FUSED SALT MIXTURES EUTECTIC COMPOSITIONS AND MELTING POINTS. DATA FROM OPEN LITERATURE, 1963-JUNE 30, 1965. VOLUME 2,
Sandia Corp., Albuquerque, N. Mex.
For primary bibliographic entry see Field 7D.
For abstract, see NSA 21 09.
SC-R-65-930-Vol-2 HC$3.00 MF$0.65

5C. ECONOMICS

CONSUMER BEHAVIOR AND WORKER PARTICIPATION IN RECOVERY ACTIVITIES,
Human Sciences Research Inc Mclean Va 4710
For primary bibliographic entry see Field 15C.
AD-651 098 HC$3.00 MF$0.65

THE EVALUATION OF SELECTED PRESENT AND POTENTIAL POVERTY PROGRAMS,
Institute for Defense Analyses, Arlington, Va. Economic and Political Studies Div.
Richard Muth. Jan 66, 91p Study-S-244, IDA/HQ-66-5594

Descriptors: (*Federal budgets, Wages), Employment, Training, Education, Population, Costs, Management planning.
Identifiers: Poverty programs.

The study attempts to evaluate the efficiency of alternative programs aimed at increasing the incomes of poor families. It deals with programs involving education and training as well as those which represent direct measures for increasing family income (specifically, adjustment of transfer or tax payments and measures to increase wages earned). The effects of these two types of programs-education and direct income remedies-are not strictly comparable, since the former involves long-term effects over the life of the worker while the latter have an immediate impact on family income. In order to compare such programs a common measure of efficiency is needed. The one chosen here is the annual cost to the government of raising income by $100 per year (pre-tax, post-transfer) until the worker reaches age 65. A rate of 9 percent was used to discount future income. In evaluating education and training programs the criterion applied in judging benefits is not the change in employment but the increase in the workers' future earnings. This criterion is used because some unemployed may find jobs without additional training and some graduates may lose jobs after initial placement, and because the long-run effect of training programs is probably higher earnings, not lower overall unemployment rates. In the absence of adequate data on the benefits of education and training programs, it was assumed that Head Start or nine months of MDTA or Job Corps training would yield the same average increase in earnings as an additional year of high school education. (Author)
PB-174 444 HC$3.00 MF$0.65

THE DISTRIBUTION OF GROSS BENEFITS OF PRESENT FEDERAL WELFARE AND INCOME MAINTENANCE PROGRAMS,
Institute for Defense Analyses, Arlington, Va. Economic and Political Studies Div.
For primary bibliographic entry see Field 5A.
PB-174 445 HC$3.00 MF$0.65

POVERTY AND LABOR-FORCE PARTICIPATION.
Institute for Defense Analyses, Arlington, Va. Economic and Political Studies Div.
For primary bibliographic entry see Field 5I.
PB-174 446 HC$3.00 MF$0.65

THE STRUCTURAL CHANGE HYPOTHESIS FOR EMPLOYMENT AMONG YOUTH, THE AGED, AND MINORITIES: A CRITICAL ANALYSIS.
Institute for Defense Analyses, Arlington, Va. Economic and Political Studies Div.
For primary bibliographic entry see Field 5I.
PB-174 447 HC$3.00 MF$0.65

COMPARISON OF ALTERNATIVE METHODS OF PROJECTING THE POVERTY RATE.
Institute for Defense Analyses, Arlington, Va. Economic and Political Studies Div.
For primary bibliographic entry see Field 5I.
PB-174 448 HC$3.00 MF$0.65

PROJECTIONS OF THE NUMBER OF POOR FAMILIES TO 1970 AND 1975.
Institute for Defense Analyses, Arlington, Va. Economic and Political Studies Div.
For primary bibliographic entry see Field 5I.
PB-174 449 HC$3.00 MF$0.65

THE REMOVAL AND UTILIZATION OF JUNKED AUTOMOBILES IN EASTERN KENTUCKY.
Battelle Memorial Inst., Columbus, Ohio. Columbus Labs.
For primary bibliographic entry see Field 13F.
PB-174 464 HC$3.00 MF$0.65

PRELIMINARY PLANNING TOURIST FACILITIES ALABAMA-COUSHATTA INDIAN RESERVATION, POLK COUNTY, TEXAS.
Brown and Root, Inc., Houston, Tex.
Mar 67, 95p
Contract C-166-66
Prepared in cooperation with Economic Development Administration, Washington, D. C. Availability: Original document in color until exhausted.

Descriptors: (*Economics, *Texas), (*Recreation, Texas), Maintenance, Lakes, Dams, Museums, Boats, Costs, Feasibility studies.
Identifiers: Tourist industry, Indian reservations.

The purpose of the study was to establish the feasibility or non-feasibility of constructing and operating tourist and recreational facilities in and for the Alabama-Coushatta Indian Reservation in Polk County, Texas. The basic planning concept involved the maintenance, as far as possible, of normal home life for the Indians living on the Reservation, while at the same time providing an attractive, unique, and profitable center for tourists and vacationers. A new entrance is proposed to the tourist facilities, which will be centered around a 450-acre lake on Bear Creek. Campsites, cabins, swimming facilities, and other recreational features will be clustered along the western lakeshore. Across the sam on the eastern shore, tourist attractions will include a living Indian Village, arts and handicraft manufacturer and sales, a narrow-gauge railroad for nature tours, a museum, a restaurant and boating facilities. A grocery store, washateria, beauty and barber shop and office building will

be provided for both the Indians and the tourists in the area that is currently being used as the administrative and social center of the Reservation. It is estimated that the total capital cost of these facilities will be $2,983,960. A benefit-cost analysis shows that the benefit-cost ratio is 1.5, based on state bonds sold at 4.5 percent for a twenty year maturity period. The anticipated revenues and general fiscal returns expected are not sufficient to make the project feasible for private financing. The project is definitely feasible, however, if public sources can be used. It is estimated that the facilities will make the Reservation self-supporting to the extent that the taxpayers of the State of Texas will save nearly $120,000 annually on maintenance of the Reservation. The proposed development will raise the average family income on the Reservation and will provide 143 permanent, full-time jobs. (Author)
PB-174 466 HC$3.00 MF$0.65

NATIONAL ARTS CENTER PROJECT FEASIBILITY STUDY.
Final rept.
Indiana Univ. Foundation, Bloomington.
31 Dec 66, 261p
Supported in part by Economic Development Administration, Washington, D. C. and Springs Valley Development Corp.

Descriptors: (*Culture, *Economics), Site selection, Urban areas, Buildings, Employment, Design, Costs, Management engineering, Feasibility studies, Professional personnel, Education, Indiana.

Generally, this project contemplates a study of the feasibility of renovating the West Baden College buildings and land into a national center for the arts. It includes an examination of the potential employment effects and general economic benefits of such a center. However, the primary effort is to be directed to a solid program depicting exactly what an arts center would be and need in terms of design, developments costs and financing, curricula-productions, and other actual operating and center management factors. The depth economic-feasibility-impact analyses is not to be underemphasized, but the EDA directive indicated that at least 75-80 percent of professional services under this approved project would be allotted to the more practical design, program and management factors. (Author)
PB-174 469 HC$3.00 MF$0.65

UTILIZING A COLLEGE'S RESOURCES TO PROVIDE MANAGEMENT ASSISTANCE TO BUSINESS FIRMS IN SOUTHERN WEST VIRGINIA.
Concord Coll., Athens, W. Va. Center for Economic Action.
For primary bibliographic entry see Field 5A.
PB-174 471 HC$3.00 MF$0.65

TOURIST-RECREATION POTENTIAL IN THE KATAHDIN VALLEY AREA, MAINE.
Technical Planning Associates, New Haven, Conn.
Mar 67, 78p
Prepared in cooperation with Economic Development Administration, Washington, D. C. Original document in color until exhausted.

Descriptors: (*Economics, Maine), (*Recreation, Maine), Commerce, Terrain, Industries.
Identifiers: Tourist industries, Area redevelopment.

The Katahdin Valley Area is an isolated and independent region, largely surrounded by wilderness. It is a low income area with little financial resource. It has considerable potential for recreation industry because of its scenic beauty, lakes, wilderness. At present, it lacks facilities to attract and accommodate any appreciable number of visitors. The area has been isolated but access is much improved by construction of Interstate Highway 95, now finished to within 35 miles of the center of the area and scheduled to be completed in less than two years. It will compare favorably with other inland Maine areas in driving time from metropolitan areas. The Katahdin Valley Development Authority and the local communities should establish a long-range program to provide facilities for tourists, including the best use of land owned by some of the towns, provisions for golf, tennis, winter sports, highway improvements especially for access to the wilderness. The Authority should engage in an active program of publicity and advertising for the area, including the publication of a guide book and other descriptive material. It should encourage planning and zoning in the towns, a 'clean-up, paint-up' campaign.
PB-174 472 HC$3.00 MF$0.65

SKIING TRENDS AND OPPORTUNITIES IN THE WESTERN STATES.
Forest Service research paper,
Intermountain Forest and Range Experiment Station, Ogden, Utah.
Roscoe B. Herrington. 1967, 100p RP-INT-34
Prepared in cooperation with Economic Development Administration, Washington, D. C.

Descriptors: (*Recreation, United States), Site selection, Statistical data, Costs, Economics, Tables, Factor analysis, Questionnaires.
Identifiers: Skiing, Ski industry.

The report is concerned with describing the ski industry and skiers in the Western States. It traces the growth pattern of skier attendance at ski areas in the West since 1955, estimates the probable attendance for 1976, and presents an analysis of factors that affect present and could influence future attendance. A survey was made at all western ski areas that operated during the 1964-65 season. It was conducted by the Intermountain Forest and Range Experiment Station at the request of the Economic Development Administration. All ski area operators and a sample of nearly 6,000 skiers were questioned. This represents the most comprehensive study of western skiing made to date. (Author)
PB-174 473 HC$3.00 MF$0.65

ENTREPRENEURIAL REPORT,
Washington Univ., Seattle. Graduate School of Business Administration.
Myles S. Delano, Dudley W. Johnson, and Robert T. Woodworth. Mar 66, 294p
Contract Cc-6036
Prepared in cooperation with Economic Development Administration.

Descriptors: (*Commerce, Washington (State)), Economics, Organizations, Questionnaires, Employment, Agriculture, Industries.

The focal point of the study was the entrepreneurial function in business formations during the period 1960 - 1962 in two counties in the state of Washington. One county was primarily agricultural and characterized by a high unemployment rate. The other county was both agricultural and industrial but had moderate unemployment during the period studied. The coverage of business firms organized in the years 1960 - 1962 was extensive and the study involved an integrated effort to obtain comprehensive information about business formations rather than an attempt to obtain a collection of isolated case studies. The period of each business formation was defined as beginning with the initial idea to start the business and running to the time of the first sale made by the business. (Author)
PB-174 483 HC$3.00 MF$0.65

JUDICIAL CONSIDERATION OF TECHNOLOGICAL FACTORS IN ANTITRUST ACTIONS.
National Bureau of Standards, Washington, D. C. Office of Invention and Innovation.
For primary bibliographic entry see Field 5D.
PB-174 532 HC$3.00 MF$0.65

FUTURE MARKET FOR UTILITY COAL IN NEW ENGLAND.
Little (Arthur D.), Inc., Cambridge, Mass.
Nov 66, 179p
Contract 14-01-0001-489
Prepared in cooperation with Office of Coal Research.

Descriptors: (*Coal, *Commerce), Power supplies, Costs, Transportation, Handling, Nuclear power plants, Economics, Operation, Maintenance, Fuel oil, Industrial production.

The report sets forth the findings of a study of the New England electric utility market for steam coal, undertaken by Arthur D. Little, Inc., on behalf of the Office of Coal Research, United States Department of the Interior. (1) The future demand for electric power in the region; forward planning by the region's utility systems to meet this demand with existing or new generating capacity; and prospective requirements for energy fuels. (2) Current and projected costs of major competitive energy fuels. (3) Opportunities for reducing delivered coal prices relative to alternative fuel costs through lower-cost transportation and/or improved handling. (4) Prospective or potential markets for coal under varying cost assumptions derived from the preceding analysis.
PB-174 540 HC$3.00 MF$0.65

EQUIPMENT FOR THE PULP AND PAPER INDUSTRY IN SWEDEN.
Squires (C. K.), Inc., Stockholm (Sweden).
Mar 66, 49p
Rept. on Foreign Market Survey. Prepared in cooperation with Business and Defense Services Administration, Washington, D. C.

Descriptors: (*Paper industry, *Industrial equipment), Industrial procurement, Wood pulp, Commerce, Machines, Industrial production, Sweden.

The study is on the Swedish paper and pulp industry. The study contains the sources of equipment, as shown in statistics, pointing to scale of local production and export, for some ranges, compared with import. (Author)
PB-174 546 HC$3.00 MF$0.65

POWER HAND TOOLS IN JAPAN.
Adams (T. F. M.) and Co., Inc., Tokyo (Japan).
Jul 66, 78p
Rept. on Foreign Market Survey. Prepared in cooperation with Business and Defense Services Administration, Washington, D. C.

Descriptors: (*Small tools, Japan), (*Commerce, Small tools), Industrial production, Power equipment, Pneumatic devices, Economics.

After interviewing over thirty users, makers and sellers, it was concluded that a U.S. Trade Center exhibition of powerhand tools should be successful in stimulating interest and exports of U.S. tools. Judging from import data, comments of people involved, air tools should be emphasized, because they offer a better growth potential for importers and less competition from large domestic makers. Specifically mentioned as good trade fair prospects by users were: pneumatic tools, electric tools and gasoline powered tools.
PB-174 547 HC$3.00 MF$0.65

LABORATORY EQUIPMENT IN JAPAN.
Parker (Graham), Tokyo (Japan).
Aug 66, 27p
Rept. on Foreign Market Survey. Prepared in co-

operation with Business and Defense Services Administration, Washington, D. C.

Descriptors: (*Laboratory equipment, Japan), (*Commerce, *Japan), Economics, Costs, Test equipment (Electronics), Industries, Distribution (Economics), Industrial production, Instrumentation.

The specific objectives of the study were to analyze the potential markets and marketing factors in this country for precision, high-speed laboratory equipment with particular reference to marketing opportunities for American products. The report is the synthesis of the information obtained from our field visits to a selected number of Japanese manufacturers, importers representing foreign firms, laboratory equipment users including national research laboratories and private industries, and relevant trade associations. (Author)
PB-174 549 HC$3.00 MF$0.65

MACHINERY, COMPONENTS AND ACCESSORIES FOR PULP AND PAPER PRODUCTION AND PAPER CONVERTING IN THE FEDERAL REPUBLIC OF WEST GERMANY.
Fry (George) and Associates, Inc., Frankfurt am Main (West Germany).
Jul 65, 103p
Rept. on Foreign Market Survey. Prepared in cooperation with Business and Defense Services Administration, Washington, D. C.

Descriptors: (*Paper industry, *West Germany), Commerce, Economics, Wood pulp, Industrial production, Machines, Consumption, Costs, Labor.

Various aspects of the German paper making and converting industries are discussed with the objective of providing American manufacturers of machinery, components and accessories for these industries with enough background and insight to enable them to assess the German market potential for their specific product (s) or service (s). German manufacturers of machinery for all sectors of the paper industry produce equipment of excellent quality and design at extremely competitive prices - outselling the United States three to two ($113 millions versus $77 millions in 1963) in the world export market. Germany's share of that market is 30.8 percent versus 20.7 percent for the United States. Because of this situation, imports to Germany of machinery and components for the paper industry are comparatively small. In 1964 total imports, from all sources, were $15 millions versus domestic sales of $120 millions. Of these imports, about $3 millions originated in the United States for direct shipment to Germany.
PB-174 550 HC$3.00 MF$0.65

WELDING EQUIPMENT AND MATERIALS IN THE UNITED KINGDOM.
Barclay (B. H.), Product Sales Analysis Ltd., London (England).
Aug 66, 74p
Rept. on Foreign Market Survey. Prepared in cooperation with Business and Defense Services Administration, Washington, D. C.

Descriptors: (*Welding, Great Britain), (*Commerce, *Great Britain), Economics, Machines, Industries, Industrial production, Arc welding, Resistance welding, Inert gas welding, Ultrasonic welding, Electron beam welding, Distribution (Economics).

Given the extent of existing U.S. penetration, the intensity of competition in all the main sectors of the market, and low levels of research and development activity among most British manufacturers, all indications are that the newly developing techniques offer readiest scope for additional supplies of U.S. equipment. It is considered that the following items rate as 'musts' for inclusion in a show of U.S. products: Gas-shielded CO2 welding equipment, particularly for semi-automatic operation; Flux cored wire; Plasma arc welding equipment, including plasma transfer arc equipment for hardsurfacing; and Pulsed arc welding equipment. Other items expected to be of general interest and to offer long-term growth prospects are: Friction welding equipment; Electroslag welding equipment; Fully automated welding systems; Electron beam welding equipment, particularly of the type that will operate under partial pressures; and Positioning equipment. Other items expected to be of specific interest are: Small seam welders; Alternatives to Sciaky's patents for heavy duty 3-phase resistance welders; Miniature argon-arc welders for thin film circuits; Equipment for welding wires to the pins of electrical connections.
PB-174 552 HC$3.00 MF$0.65

DAIRY AND OTHER FOOD PROCESSING EQUIPMENT IN SWEDEN.
Squires (C. K.), Inc., Stockholm (Sweden).
Aug 66, 32p
Rept. on Foreign Market Survey. Prepared in cooperation with Business and Defense Services Administration, Washington, D. C.

Descriptors: (*Kitchen equipment + supplies, Sweden), (*Commerce, *Sweden), Economics, Industrial production, Food, Milk, Machines.
Identifiers: Dairy equipment, Food processing equipment.

The Swedish market for dairy equipment is dominated by local manufacturers, who also maintain a high level of export, Alfa Laval is, by all standards, the dominant company in the business. Level of import of equipment is, in consequence, small, and taken principally from Scandinavia and West Germany. The import from the US is little above token level and it is considered unlikely, in the trade, that it can be greatly increased despite the evident respect for the product range offered. Prospects for dairy laboratory equipment for ice cream making equipment and for items for use in automation are somewhat better. (Author)
PB-174 553 HC$3.00 MF$0.65

ANIMAL HUSBANDRY EQUIPMENT IN THE UNITED KINGDOM.
Barclay (B. H.), Product Sales Analysis Ltd., London (England).
May 66, 43p
Rept. on Foreign Market Survey. Prepared in cooperation with Business and Defense Services Administration, Washington, D. C.

Descriptors: (*Agriculture, Great Britain), (*Commerce, *Great Britain), Animals, Machines, Food, Distribution (Economics), Production, Milk, Economics.

The objectives of the survey were to: (1) Gauge the overall U.K. market potential for U. S. equipment, accessories and materials used on the farm for the feeding and care of livestock, including poultry; (2) Identify specific products for which the potential appears particularly promising; (3) Provide data that will assist in the formulation of a marketing programme and in laying the groundwork for a promotion campaign; (4) Define promotional media used to reach the market; (5) Identify leading suppliers of the U.K. market.
PB-174 554 HC$3.00 MF$0.65

PRINTING AND BINDERY EQUIPMENT IN ITALY.
Oliver-Beckman Italiana S.r.l., Rome (Italy).
Jun 66, 75p
Rept. on Foreign Market Survey. Prepared in cooperation with Business and Defense Services Administration, Washington, D. C.

Descriptors: (*Printing, Italy), (*Commerce, *Italy), Industrial equipment, Economics, Consumption, Distribution (Economics), Graphics, Machines, Labor, Costs.

The expanding Italian consumption of printed material as a result of an improved standard of living, a rising level of education and the necessity for Italian printing concerns to renovate their plants should create an increasing demand for graphics machinery in the next few years. Approximately 60% of total demand in 1965 was covered by domestic production, while imports accounted for the remaining 40%. Italian manufacturers have dominated the market for rotogravure and flexographic presses, small offset presses, proof presses, reproduction equipment and accessories, and the less complex bindery and paper cutting machines. Competition from Italian and other European producers, especially German, no doubt poses a threat to American exporters, if only because of the marketing advantages that the former enjoy; lower transportation costs, possibility of closer cooperation with customers and - in the case of the Common Market - considerably lower import duties (by as much as 45%). Presumably, U.S. graphics equipment manufacturers seeking to enter the Italian market now will have to be even more aggressive than their predecessors if they are to break through the well-established lines of supply; but an active sales effort should uncover several as yet unexploited opportunities. (Author)
PB-174 555 HC$3.00 MF$0.65

SUCCESSFUL PRIVATE CAMPGROUNDS,
Research paper,
Northeastern Forest Experiment Station, Upper Darby, Pa.
Wilbur F. LaPage.1967, 25p RP-NE-58

Descriptors: (*Recreation, Site selection), (*Economics, Recreation), New Hampshire, Public opinion, Management planning, Costs, Water supplies, Organizations, Questionnaires.

Private enterprise now provides the majority of camping facilities in the Northeastern States. Though it was the national and state forest and parks that pioneered in providing outdoor recreation facilities for the general public, the privately owned and operated campground has now developed a large following of its own. An estimated 1,000 commercial campgrounds were in operation last year in the 14 Northeastern States from Maine to Ohio. The ratio of private campgrounds to public campgrounds is 3 to 1 for the region as a whole, and goes as high as 7 to 1 in Maine. The only Northeastern States that now have more public than private campgrounds are Maryland and West Virginia. Because of the interest in the use of forest land as potential income-producing recreation sites, research was directed toward this phenomenon of the private campground. In an exploratory study in New Hampshire, the behavior patterns of campground visitors were studied in an attempt to determine what factors spell success or failure for the private campground. (Author)
PB-174 581 HC$3.00 MF$0.65

THE MARKET FOR FIREPLACE WOOD IN AN URBAN AREA OF CONNECTICUT.
Northeastern Forest Experiment Station, Upper Darby, Pa.
For primary bibliographic entry see Field 11L.
PB-174 589 HC$3.00 MF$0.65

COSTS AND RETURNS FOR HARDWOOD LUMBER PRODUCTION IN THE APPALACHIAN REGION OF KENTUCKY AND OHIO.
Northeastern Forest Experiment Station, Upper Darby, Pa.
For primary bibliographic entry see Field 11L.
PB-174 592 HC$3.00 MF$0.65

5D. HISTORY, LAW, AND POLITICAL SCIENCE

EUROPEAN SECURITY AND THE NUCLEAR THREAT SINCE 1945,
Rand Corp Santa Monica Calif
James R. Schlesinger. Apr 67, 26p Rept no. P-3574
Prepared for presentation at Symposium, Cambridge, Mass. 7-9 Apr 1967.

Descriptors: (*Cold war, Deterrence), (*Europe, Cold war), Nuclear warfare, Military strategy, History, Political science, Foreign policy, United States, USSR, National defense, Defense systems.

The period since World War II has witnessed a cataclysmic shift in the structure of power reflecting in large measure the creation of powerful strategic nuclear capabilities and the latent or explicit employment of the nuclear threat. It has also witnessed the partial disintegration of the traditional nation-state system, and an alternation in the role assignable to this older form of social organization. Europe--whose initial attainment of international hegemony reflected the mobilization of energies through the agency of the nation-state--has suffered a power eclipse closely associated with the declining power-potential of the nation-state system. Until 1939 the center of world power, Europe became increasingly during World War II the principal target for external forces, a far less enviable position, but one which it continued to occupy through the main period of the Cold War. Since the Berlin crisis, there are signs of its ceasing to be the center of attention--and of its becoming a kind of political backwater. (Author)
AD-650 809 HC$3.00 MF$0.65

THE DEVELOPMENT OF THE SOVIET ARMED FORCES, 1917-1966.
Air Univ Maxwell AFB Ala Aerospace Studies Inst
For primary bibliographic entry see Field 15G.
AD-650 975 HC$3.00 MF$0.65

RESETTLEMENT IN LATIN AMERICA: AN ANALYSIS OF 35 CASES,
American Univ Washington D C Center for Research in Social Systems
For primary bibliographic entry see Field 5A.
AD-651 116 HC$3.00 MF$0.65

JUDICIAL CONSIDERATION OF TECHNOLOGICAL FACTORS IN ANTITRUST ACTIONS,
National Bureau of Standards, Washington, D. C. Office of Invention and Innovation.
Stanley F. Hack. 1967, 52p

Descriptors: (*Law, Commerce), United States Government, Scientific research.
Identifiers: Antitrust laws.

The cases examined indicated that there are serious gaps in the judicial treatment of technological elements. These relate to both the scope of evidence and judicial consideration of such evidence. Problems indicated include the lack of full disclosure, judicial misunderstanding of technological problems within the context of facts presented and the lack of prosecution and judicial concern with policy factors. Several alternatives to present treatment are discussed but final judgment should be reserved until more cases have been examined to determine whether these problems are the rule or the exception. (Author)
PB-174 532 HC$3.00 MF$0.65

5E. HUMAN FACTORS ENGINEERING

A LITERATURE SURVEY OF HUMAN PERFORMANCE UNDER ARCTIC ENVIRONMENT,
Human Engineering Labs., Aberdeen Proving Ground, Md.
Stanley L. Revesman, Jerry R. Hollis, and John B. Mattson, Jr. Dec 53, 22p HEL-TM-6

Descriptors: (*Human engineering, Arctic regions), (*Performance (Human), Arctic regions), Man-machine systems, Design, Vision, Hearing, Space perception, Color vision, Visual acuity, Reaction (Psychology), Reflexes, Motor reactions, Efficiency, Touch, Display systems, Optical instruments, Reviews.

Troop operational factors in the Arctic are reviewed by surveying the literature and interviewing organizations that do such research. It is concluded that: (1) Arctic conditions seem to affect troop performance and should be considered in designing machines for Arctic use; (2) the information needed to adequately modify man-machine systems for Arctic use is not yet available; (3) the effects of Arctic conditions on troop operational factors need more detailed, specific study. (Author)
AD-63 045 HC$3.00 MF$0.65

HUMAN FACTORS EVALUATION OF A LARGE SCREEN RADAR DISPLAY.
National Aviation Facilities Experimental Center Atlantic City N J
For primary bibliographic entry see Field 17G.
AD-651 033 HC$3.00 MF$0.65

HUMRRO RESEARCH ON HUMAN PERFORMANCE,
George Washington Univ Alexandria Va Human Resources Research Office
For primary bibliographic entry see Field 5I.
AD-651 045 HC$3.00 MF$0.65

TEMPORAL PATTERNS OF SIGNALS AND VIGILANCE PERFORMANCE.
Technical rept.,
Human Factors Research Inc Goleta Calif
James F. O'Hanlon, Jr., and James J. McGrath.
Mar 67, 41p Rept no. 719-3
Contract DA-49-193-MD-2743

Descriptors: (*Attention, Performance (Human)), Visual signals, Detection, Time, Problem solving, Scheduling, Experimental design, Performance tests, Display systems, Effectiveness, Perception (Psychology), Human engineering.

The role of temporal expectancy in vigilance performance was studied by comparing the performances of subjects who were presented with different temporal patterns of signals. Also studied was the effectiveness of displaying a subject's record of responses over time for the purpose of allowing him to anticipate signal occurrences. Finally the relationship between the subjects' performance and rates of subjective time was studied to confirm an earlier finding. To accomplish this, different groups of subjects were given simple, complex and random patterns of signals in daily vigilance tasks for five days. Half of each group used a graphic recorder showing a record of their responses over time and half did not. Their rates of subjective time were measured each day. On the last day all subjects were given their normal pattern during the initial period of the vigilance task but were then switched to the random pattern for the remainder of the task. Findings were: (1) the subjects did not respond to the temporal arrangement of signals but may have responded to the mean and variance of intersignal intervals in the patterns, (2) the graphic recorder interfered with, rather than improved, performance, (3) the abrupt change in pattern on the fifth day had a strong deleterious effect upon the performance of those who had learned the initial pattern, and (4) the subjects' performance was related to their rates of subjective time in the expected manner. (Author)
AD-651 047 HC$3.00 MF$0.65

ELECTROPULSE RESPONSIVITY TO CHANGES IN SKIN MOISTURE,
George Washington Univ Alexandria Va Human Resources Research Office
For primary bibliographic entry see Field 5J.
AD-651 053 Not available from CFSTI.

A FURTHER STUDY OF THE USE OF HUMAN FACTORS INFORMATION BY DESIGNERS.
Final rept., 16 Sep 66-15 Mar 67,
Bunker-Ramo Corp Canoga Park Calif Systems Effectiveness Dept
David Meister, and Dennis J. Sullivan. 16 Mar 67, 100p
Contract Nonr-4974 (00)

Descriptors: (*Human engineering, Design), Engineering personnel, Mechanical drawings, Military requirements, Mechanical engineering, Electrical equipment, Display systems, Control systems, Handbooks.

The study was performed to verify an earlier investigation which concluded that designers had little or no interest in human factors information and usually failed to apply human factors criteria to design. Ten designers from the Douglas Aircraft Company were presented with 3 4-hour tests in which they were required to develop equipment drawings, solve design problems analytically, rate the importance of design parameters, use MIL-STD-803 and similar documents, and review human factors handbook material. The general conclusions resulting from the earlier study was verified. Design analysis involved primarily the equipment's mechanical/electrical functioning. Subjects showed little interest in or ability to apply human factors data to their design problems. Internal components and equipment structure determined the selection and arrangement of controls and displays. Human factors was not recognized as a distinct discipline, nor were human factors problems in design recognized as such. There was almost no use of human factors specialists to resolve such problems. As was found in the earlier study, human factors information in handbook form is not acceptable to designers because of its academic mode of presentation and because much of the material is non-applicable to design problems. Much of the material in human factors standards is not considered to be mandatory in controlling design. (Author)
AD-651 076 HC$3.00 MF$0.65

SOME CHARACTERISTICS OF THE HUMAN OPERATOR AND HIS MATHEMATICAL REPRESENTATION IN THE TRACKING ROLE.
Royal Aircraft Establishment, Farnborough (England).
W. F. Fielding. Aug 63, 29p RAE-TN-WE-38

Descriptors: *Operator performance, *Physiological factor, *Tracking study, Factor, Mathematics, Operator, Performance, Physiology, Study, Tracking.

For abstract, see STAR 05 11.
N67-22718 HC$3.00 MF$0.65

5G. LINGUISTICS

ACOUSTICAL DESCRIPTION OF SYLLABIC NUCLEI: AN INTERPRETATION IN TERMS OF A DYNAMIC MODEL OF ARTICULATION,
Massachusetts Inst of Tech Cambridge Research Lab of Electronics
For primary bibliographic entry see Field 17B.
AD-650 676 Not available from CFSTI.

A GENERALIZATION OF CONTEXT FREE DETERMINISM,
System Development Corp Santa Monica Calif
For primary bibliographic entry see Field 9B.
AD-651 063 HC$3.00 MF$0.65

CONTEXTUAL PREDICTABILITY AND FREQUENCY FACTORS.
Technical rept.,
Illinois Univ Urbana Training Research Lab
Domenico Parisi, Ulderico Cappelli, and Lawrence M. Stolurow. Aug 66, 15p Rept no. TR-41
Contract Nonr-1834 (36), ARPA Order-454

Descriptors: (*Linguistics, Predictions), (*Semantics, *Grammars), Verbal behavior, Frequency, Italy, Language, Performance tests.
Identifiers: Italian language.

Close scores were obtained from 320 Ss for two written Italian passages totaling 616 words in such a way that each word was guessed by 32 Ss. Each word was classified into one of 12 grammatical classes. As has been found for English, content words are less predictable than function words if guessing the specific missing item is required. No such difference exists when only correct form class has to be predicted. Type-token ratio for each class appears to be correlated with specific item predictability, whereas proportion of occurrences of each form class in the language is correlated with form class predictability. Both correlations suggest that frequency properties may be an important factor even in complex language behavior. (Author)
AD-651 095 HC$3.00 MF$0.65

A LEXEMIC DICTIONARY: GOALS AND PROCEDURE DEI,
California Univ., Berkeley. Machine Translation Project.
Shirley Silver. Sep 65, 14p
Grant NSF-GN-306-1

Descriptors: (*English language, *Dictionaries), Semantics, Syntax, Russian language, Machine translation, Symbols.

The object of the research is an English lexemic dictionary. This projected dictionary will consist of lexeme entries, represented morphographemically, and a symbol system that specifies syntactic information. The lexeme entries will be limited to prefixes, stems, and suffixes. The first source for the dictionary is provided by the English equivalents in RUSDIC; however, the plan is to eventually incorporate the English equivalents in CHIDIC. The immediate goal is a 'working' dictionary file. Such a file is constructed on the basis of gross syntactic criteria which will aid in the development of an overview of the derivational patterns involved in English word formation. These criteria will also yield segmentations that provide information relevant to the development of a system of morphographemic rules. (Author)
PB-174 556 HC$3.00 MF$0.65

A FINAL ADMINISTRATIVE REPORT,
California Univ., Berkeley. Machine Translation Project.
William S-Y. Wang. Mar 67, 48p
Grant NSF-GN-306-1

Descriptors: (*Machine translation, *Linguistics), (*Russian language, Machine translation), (*Chinese language, Machine translation), Programming (Computers), Syntax, Semantics, Documentation, Dictionaries, English language, Algorithms.

The work of the project was pursued in three principal ways: (1)Formalisms were developed for subsemological linguistic description. A study was directed toward the development of a semological formalism. (2)Research into the linguistic structure of particular languages was conducted within the context of the development of formalisms. For those parts of a linguistic description for which formalisms exist, the formalisms were applied to the description of the languages currently under study. Where no formalism exists, i.e., in semology, preformal studies were carried out in the hope of revealing the necessary properties of a semological formalism. (3)Machine implementation of algorithms based on one of the formalisms was completed. Synoptic descriptions are given of the current and past research effort in particular areas. Inventories of project publications, documents and other materials pertaining to Russian, Chinese, English and programming are listed. (Author)
PB-174 560 HC$3.00 MF$0.65

5H. MAN-MACHINE RELATIONS

REPORT ON PRELIMINARY OBSERVATIONS OF HUMAN ENGINEERING PROBLEMS UNDER ARCTIC CONDITIONS 1952-53,
Human Engineering Labs., Aberdeen Proving Ground, Md.
John B. Mattson, Jr., and Jerry R. Hollis. 15 May 53, 38p Rept. no. 1

Descriptors: (*Man-machine systems, *Arctic regions), Vehicles, Ordnance, Environmental tests, Low-temperature research.

The report presents the findings of preliminary observations of human engineering problems under arctic conditions. Information was gathered at Big Delta, Alaska, Devils Lake, North Dakota, and Fort Churchill, Canada, to determine current problems and future areas for investigation. Implications of these findings are discussed and, where appropriate, recommendations are made for further study and evaluation. (Author)
AD-12 497 HC$3.00

A LITERATURE SURVEY OF HUMAN PERFORMANCE UNDER ARCTIC ENVIRONMENT,
Human Engineering Labs., Aberdeen Proving Ground, Md.
For primary bibliographic entry see Field 5E.
AD-63 045 HC$3.00 MF$0.65

THE COMING COMPUTER UTILITY--LAISSEZ-FAIRE, LICENSING OR REGULATION,
Rand Corp Santa Monica Calif
For primary bibliographic entry see Field 9B.
AD-650 945 HC$3.00 MF$0.65

URBAN NODE IN THE INFORMATION NETWORK,
Rand Corp Santa Monica Calif
For primary bibliographic entry see Field 13B.
AD-651 109 Not available from CFSTI.

5I. PERSONNEL SELECTION, TRAINING, AND EVALUATION

SHIPBOARD SYSTEMS COSTS: A FUNCTIONAL ANALYSIS OF WORK ABOARD SHIP. THE SS SHELDON LYKES: A DRY CARGO SHIP IN THE SOUTH ATLANTIC SERVICE.
National Academy of Sciences-National Research Council Washington D C Shipboard Mechanization/Manpower Comm
For primary bibliographic entry see Field 13J.
AD-650 625 HC$3.00 MF$0.65

DAS MATHEMATISCHE WERK VON FELIX HAUSDORFF (The Mathematical work of F. Hausdorff),
Syracuse Univ N Y Dept of Mathematics 3334
G. G. Lorentz. Apr 67, 28p
AFOSR-67-0873
Contract AF 49 (638)-1401
Text in German.
Availability: Published in Jahresber Deutschen Math-Vereinigung v69 n2 p54-62 1967.

Descriptors: (*Scientific personnel, Mathematics), Set theory, Topology, Mathematical analysis.

The article describes the life and mathematical achievements of F. Hausdorff and his influence on present-day Mathematics. F. Hausdorff (born in 1868, died in 1942) was a German mathematician of Jewish extraction. In Mathematics he was a forerunner of Bourbaki. His influence is felt to this day, in particular in Set Theory, general Topology and Analysis. (Author)
AD-650 656 Not available from CFSTI.

COMPARISON OF RANK CORRELATIONS CONCERNING SALARY, SIZE OF STAFF AND DEGREE LEVEL.
Management analysis memo.,
Office of the Director of Defense Research and Engineering Washington D C
Frank A. Nicolai. 1 Oct 65, 6p Rept no.
ODDRE-MAM-65-1

Descriptors: (*Scientific research, Professional personnel), (*Laboratories, Navy), (*Professional personnel, Laboratories), Naval research, Wages, Personnel management, Scientific organizations, Department of Defense, Government employees.

The analysis covers three distinct population groups: (1) 7 Navy laboratories, all of which are under Bureau of Ships control, (2) 23 private companies for which data were collected by Mr. E. M. Glass, Acting Assistant Director (Laboratory Management), Office of the Director of Defense Research and Engineering, and (3) 14 private companies which were part of a survey by the Stanford Research Institute (SRI). The criterion for choosing these groups was sameness of data-gathering methods. (Author)
AD-650 665 HC$3.00 MF$0.65

AN APPROACH TO ESTIMATING THE COST OF THE PROPOSAL TO RAISE ALLOWANCES OF HIGH-GRADE POSITIONS FOR DoD LABORATORIES.
Management Analysis memo.,
Office of the Director of Defense Research and Engineering Washington D C
Frank A. Nicolai. 1 Oct 65, 4p Rept no.
ODDRE-MAM-65-2

Descriptors: (*Personnel management, *Department of Defense), (*Professional personnel, Department of Defense), Wages, Laboratories, Scientific research, Costs, Government employees.

In the report of the Department of Defense (DoD) Task 97 Action Group, Grade and Salary Distribution of Selected DoD In-House Laboratories, 30 April 1965, a proposal was made to raise the allowance of high-grade positions (GS-14 and above) in FY 1966. The proposal also calls for the retention of present ceilings on manpower spaces. Thus, for each GS-14 or above added, one GS-13 or below would be eliminated. All space changes refer to the professional scientific and engineering population. The initial impact of this proposal can be conceived as raising 803 average GS-13s to 803 average GS-14s. Its cost impact is shown. (Author)
AD-650 666 HC$3.00 MF$0.65

THEORETICAL ANALYSIS OF IMPACT ON OPERATIONAL EFFECTIVENESS BY CONTROL OF HIGH GRADES, AVERAGE SALARY AND MANPOWER SPACES.
Management analysis note,

Office of the Director of Defense Research and Engineering Washington D C
Frank A. Nicolai. 1 Oct 65, 9p Rept no. ODDRE-MAN-65-2

Descriptors: (*Personnel management, Optimization), Manpower, Wages, Budgets, Professional personnel, Laboratories, Government employees, Management control systems.

Indifference curves and maximizing principles of economic analysis are used to demonstrate how management controls over high grades, average salary and manpower spaces prevent the line manager who is limited to a certain dollar budget from optimizing his organization's effectiveness. For the sake of simplicity and clarity, the analysis is restricted to a two-dimensional framework, although it can easily be extended to as many dimensions as desired, depending on the number of inputs. First, the general method of optimizing the allocation of resources is discussed, and then the impact of each control is separately analyzed. (Author)
AD-650 667 HC$3.00 MF$0.65

CYBERNETIC TESTING.
Rept. for Nov 63-May 65,
Electronic Systems Div L G Hanscom Field Mass Decision Sciences Lab
Emir H. Shuford, Jr. Mar 67, 34p Rept no. ESD-TR-67-229

Descriptors: (*Programmed instruction, Computer programs), (*Measure theory, *Teaching methods), Students, Psychometrics, Reaction (Psychology), Programming (Computers), Cybernetics.

This report presents a concrete realization of an admissible probability measurement procedure utilizing a computer-driven scope and light pen. This particular technique is appropriate for all multiple-choice type of testing. Empirical results are reported from an analogous pencil-and-paper realization of the same admissible probability measurement procedure. These results indicate a marked superiority for admissible probability measurement over traditional multiple-choice testing. It is suggested that further gains can be obtained by using admissible probability measurement procedures to sequentially test the scope of knowledge of a student.
AD-650 668 HC$3.00 MF$0.65

SHIPBOARD SYSTEMS COSTS: A FUNCTIONAL ANALYSIS OF WORK ABOARD SHIP. SS CITIES SERVICE BALTIMORE: A TANKER IN THE ATLANTIC COASTAL SERVICE.
National Academy of Sciences-National Research Council Washington D C Shipboard Mechanization/Manpower Comm
For primary bibliographic entry see Field 13J.
AD-650 843 HC$3.00 MF$0.65

STUDY OF TRAINING EQUIPMENT AND INDIVIDUAL DIFFERENCES.
Technical rept. 26 Jun 64-24 Jan 67,
American Institutes for Research in the Behavioral Sciences Palo Alto Calif
G. Kasten Tallmadge, and James W. Shearer. 16 Mar 67, 123p
NAVTRADEVCEN-66-C-0043-1
Contract N61339-66-C-0043

Descriptors: (*Teaching methods, Effectiveness), Learning, Military training, Training devices, Aptitude tests, Factor analysis, Achievement tests, Experimental design, Performance (Human).

The aim of this project was to determine whether training effectiveness could be increased by employing training methods which differed as a function of trainee characteristics. A study was designed involving a control and two experimental training methods and 16 measures of trainee aptitudes and interests. The experimental training methods were designed to reflect Gagne's (1965) Type 3 (chaining) and Type 7 (Principle Learning) theoretical constructs. Large achievement differences resulted from the three training methods. No interactions between training methods and learner characteristics were found, however, either with single aptitude measures, with combined measures, or by means of covariance analysis. It was concluded that these negative findings resulted from the existence of interactions between subject matter content and training methods. (Author)
AD-650 850 HC$3.00 MF$0.65

RESPONSE TIMES IN DECISION-MAKING TASKS.
Air Force Cambridge Research Labs L G Hanscom Field Mass
For primary bibliographic entry see Field 5J.
AD-650 908 HC$3.00 MF$0.65

QUANTIFICATION OF PERSONNEL PERFORMANCE FOR COST EFFECTIVENESS DECISIONS: I. AN ANNOTATED BIBLIOGRAPHY.
Research memo.,
Naval Personnel Research Activity San Diego Calif
Joe E. Willis, and Andrew N. Dow. Apr 67, 68p Rept no. SRM-67-15

Descriptors: (*Naval personnel, Performance (Human)), (*Cost effectiveness, Systems engineering), Bibliographies, Predictions, Effectiveness, Reliability, Manpower.

As the first phase of a project to develop a method of predicting personnel performance effectiveness, a search of the literature was made. Quotes, notes, and comments for the use of the research team were made for each article. From the materials assembled, 115 items were selected for an annotated bibliography covering five areas: (1) Personnel performance effectiveness measurement, (2) Personnel performance effectiveness prediction, (3) Human reliability in systems, (4) Personnel performance data utilization problems, and (5) Function allocation.
AD-650 933 HC$3.00 MF$0.65

ON THE USE OF UNIVERSAL ELECTRONIC COMPUTERS FOR PROGRAMMED INSTRUCTION,
Foreign Technology Div Wright-Patterson AFB Ohio
V. G. Koryakov. 17 Mar 67, 26p Rept no. FTD-MT-65-202
TT-67-61650
Ob Ispolzovanii Universalnykh Elektronno-Vychislitelnykh Mashin dlya Programmirovannogo Obucheniya, edited machine trans. of mono. Programmirovannoe Obuchenie i Kiberneticheskie Obuchaiushchie Mashiny, n. p. 1963 p139-59.

Descriptors: (*Programmed instruction, Digital computers), (*Teaching machines, Design), Training, Film readers, Automatic, Input-output devices, German language, Russian language, USSR.

A discussion is given of certain results of experimental application of digital computers to programmed learning and the principles of constructing teaching systems. Three models of the teaching process are presented: parallel, sequential, and branching. A block diagram is given for a training system using an electronic computer, and use of the 'Ural-1' machine with ST-35 instruments as inputs is discussed for teaching translation from German to Russian and design of radio receivers. Use of multipurpose computers (UMShN /Universalnaya Mashina Shirokogo Naznacheniya/) with automatic film viewers as output devices for study of radiotechnical circuits is described.
AD-651 035 HC$3.00 MF$0.65

STUDENT INDEXER TRAINING PROGRAM AND THE IMPROVED OPERATION OF A DOCUMENT RETRIEVAL SYSTEM.
Dayton Univ Ohio Research Inst
For primary bibliographic entry see Field 5B.
AD-651 039 HC$3.00 MF$0.65

HUMRRO RESEARCH ON HUMAN PERFORMANCE,
George Washington Univ Alexandria Va Human Resources Research Office
Meredith P. Crawford. Apr 67, 21p Rept no. Professional paper 14-67
Contract DA-44-188-ARO-2
Presented at Purdue Univ., Lafayette, Ind., May 19, 1966.

Descriptors: (*Army training, Scientific research), (*Performance (Human), Scientific research), Applied psychology, Leadership, Organizations, Professional personnel, Language, Pilots, Officer personnel, Learning, Human engineering.

The present organizational structure of HumRRO has evolved in relation to the structure of its client, the United States Army. The Army is an hierarchical organization with permanent training installations spread across the nation, and world-wide operations. HumRRO's organizational design and working relations with the Army have been tailored to provide the following: (1) Open and easy communication between military and research personnel, at all echelons, on the selection of relevant and important research and development topics important to the U.S. Army. (2) Direct access to Army schools and training centers for research and experimentation in training. (3) Techniques of communication between HumRRO and the Army to promote maximum utilization of results. (Author)
AD-651 045 HC$3.00 MF$0.65

PROGRAMMED LEARNING: PROLOGUE TO INSTRUCTION,
George Washington Univ Alexandria Va Human Resources Research Office
Robert J. Seidel. 6 Jan 66, 13p Rept no. Professional Paper-17-67
Contract DA-44-188-ARO-2
Availability: Published in Psychological Reports v20 n1 p307-16 Feb 1967.

Descriptors: (*Programmed instruction, *Learning), Reviews, Computers, Psychology, Problem solving.

The paper indicates some pertinent issues in the field of programmed instruction (PI) and suggests promising directions for future growth of PI, both as a medium for the application of principles of learning and as a means of furthering our understanding of learning processes. Practical and theoretical implications are touched upon and combined to give a position statement on PI as a pedagogical and psychological research tool. In this vein the utility and inevitability of computer-aided instruction are discussed. (Author)
AD-651 052 Not available from CFSTI.

TECHNOLOGY AND ARMAMENT.
Department of the Army Washington D C 0900
For primary bibliographic entry see Field 15G.
AD-651 106 HC$3.00 MF$0.65

RESULTS FOR AN ADDITIONAL FOLLOW-UP CRITERION ON A SAMPLE OF AIR FORCE SCIENTISTS,
Utah Univ Salt Lake City
Calvin W. Taylor, and Kan Yagi. Dec 66, 16p
AFOSR-67-0896
Grant AF-AFOSR-144-63

Descriptors: (*Scientific personnel, Psychometrics), Air Force research, Aptitude tests, Personality, Scientific organizations, Creativity, Performance (Human), Personnel management.

The report supplements an earlier study (AD-267 832) in which 17 measures of 'constributions' of scientists were used as criteria for validating 130 predictor scores for measuring psychological characteristics of the scientists. This report relates to an additional 'over-all' criterion that was obtained for 80 of the original 107 subjects. The criterion was a 6-man committee rating of the scientist. The Biographical Information Blank was again the best single predictor instrument of the new criterion. Aptitude test scores ranked more significantly than previously. T-test comparisons are given for 30 empirically keyed Biographical scores. None of the scores based on a criterion of status-seeking, 'organization-man' tendencies was significant with respect to the over-all criterion. Likeableness as a member of the research team was the most important criterion dimension with respect to the over-all criterion. Current organizational status also ranked high. Criterion dimensions of quality of product, originality of product, and creativity ratings had little effect on the over-all criterion rating. Some discussion of these findings and of the explanatory power of the profiles of a scientist's contributions is presented. An analysis of criterion intercorrelations by different sources is presented that shows the complexity of the criterion problem and differences that arise in scores of a scientist's performance dependent on the scorer (the individual himself, immediate supervisors, higher level supervisors, peers). (Author)

AD-651 119 HC$3.00 MF$0.65

THE NATURE AND SCOPE OF AGGLOMERATION EFFECTS OF CITY SIZE AND ADVANCED SCIENTIFIC TRAINING ON INDUSTRIAL RESEARCH LABORATORIES.

Missouri Univ., Columbia. Research Center.
J. C. Murdock. 22 Mar 67, 54p NASA-CR-83395
Contract NGR-26-004-012

Descriptors: *Economics, *Statistics, Agglomeration, Homogeneity, Industry, Laboratory, Sampling, Science, Training, University program.

For abstract, see STAR 05 11.
N67-22428 HC$3.00 MF$0.65

THE ADDITION OF PERIPHERAL VISION TO THE ARTIFICIAL HORIZON.

Queens Univ., Belfast (Northern Ireland).
K. J. Holden. Jun 63, 14p ARC-CP-731, ARC-24916
14 P Refs

Descriptors: *Horizon, *Simulator training, *Visual aid, Aircraft, Artificial, Control, Guidance, Periphery, Pilot, Pitch, Roll, Stationary, Test.

For abstract, see STAR 05 11.
N67-22793 HC$3.00 MF$0.65

THE EVALUATION OF SELECTED PRESENT AND POTENTIAL POVERTY PROGRAMS,

Institute for Defense Analyses, Arlington, Va. Economic and Political Studies Div.
For primary bibliographic entry see Field 5C.
PB-174 444 HC$3.00 MF$0.65

THE DISTRIBUTION OF GROSS BENEFITS OF PRESENT FEDERAL WELFARE AND INCOME MAINTENANCE PROGRAMS,

Institute for Defense Analyses, Arlington, Va. Economic and Political Studies Div.
For primary bibliographic entry see Field 5A.
PB-174 445 HC$3.00 MF$0.65

POVERTY AND LABOR-FORCE PARTICIPATION.

Research paper,
Institute for Defense Analyses, Arlington, Va. Economic and Political Studies Div.
Anthony Fisher. Feb 66, 35p RP-P-273, IDA/HQ-66-5476
Prepared in cooperation with Office of Economic Opportunity.

Descriptors: (*Labor, Employment), (*Employment, Economics), Sociometrics, Wages, Population.
Identifiers: Poverty.

The aim of the paper is to review empirical studies on the relation between labor-force participation by particular population groups and unemployment rates, wages, and transfer income. The population groups considered are: (1) married women; (2) older men, 65 and over; (3) teenage males, 14-19; (4) teenage girls; (5) prime age males, 25-54; (6) older women (a) Single, 55-59 (b) 65 and over; and (7) female heads of families. The regression results generally indicate the expected impact of unemployment, wage rates, and other income on labor-force participation. Although cross-section and time-series approaches do not give identical results, they do not usually produce results that are inconsistent. The results do support the argument that there is hidden unemployment, i.e., that there are people who would try to seek employment if there were a better chance of succeeding. (Author)

PB-174 446 HC$3.00 MF$0.65

THE STRUCTURAL CHANGE HYPOTHESIS FOR EMPLOYMENT AMONG YOUTH, THE AGED, AND MINORITIES: A CRITICAL ANALYSIS.

Research paper,
Institute for Defense Analyses, Arlington, Va. Economic and Political Studies Div.
Richard F. Muth. Feb 66, 28p RP-P-275, IDA/HQ-66-5478
Prepared in cooperation with the Office of Economic Opportunity.

Descriptors: (*Employment, Regression analysis), Economics, Predictions, Wages, Population.
Identifiers: Poverty.

Plans for the long run shape of the Poverty program must hinge, in part, on projections of the number and composition of the poor. Projections made by both IDA and the Council of Economic Advisors indicate that even rapid economic growth will still leave a substantial number of families poor in 1970 and 1980. Gallaway, in contrast, has argued that most poverty will be eliminated automatically if the US economy grows at the rate achieved in the period 1947-56, and that large expenditures or special poverty programs are unnecessary. The aim of the paper is to compare and evaluate the projection methods used by the Council of Economic Advisors, Gallaway, and IDA. (Author)

PB-174 447 HC$3.00 MF$0.65

COMPARISON OF ALTERNATIVE METHODS OF PROJECTING THE POVERTY RATE.

Research paper,
Institute for Defense Analyses, Arlington, Va. Economic and Political Studies Div.
Richard F. Muth. Jan 66, 27p RP-P-276, IDA/HQ-66-5475
Prepared in cooperation with the Office of Economic Opportunity.

Descriptors: (*Employment, *Economics), Wages, Sociometrics, Regression analysis, Labor, Training.
Identifiers: Poverty.

The aim of the research is to determine whether recent high unemployment rates for youths, the aged, or minorities have been due to structural changes in the US economy or to high general unemployment rates. In general, the results indicate that the rise in rates for unskilled relative to skilled workers appears to be attributable to the greater sensitivity of unemployment rates for the unskilled with respect to the overall rate. There is virtually no evidence for the structural-change hypothesis in so far as occupational groups are concerned, although there is evidence that the demand for the more highly skilled has grown more rapidly during the 1950's than the demand for the unskilled and that relative wage rate changes have reflected this. When workers are divided according to age, sex, and race rather than occupational groups, the overall unemployment rate still appears very important in determining the group unemployment rate. (Author)

PB-174 448 HC$3.00 MF$0.65

PROJECTIONS OF THE NUMBER OF POOR FAMILIES TO 1970 AND 1975.

Research paper,
Institute for Defense Analyses, Arlington, Va. Economic and Political Studies Div.
Elliot Wetzler. Oct 66, 40p RP-P-278, IDA/HQ-66-5477
Prepared in cooperation with the Office of Economic Opportunity.

Descriptors: (*Wages, Mathematical prediction), Economics, Sociometrics, Distribution (Economics), Factor analysis.
Identifiers: Poverty.

The paper estimates the numbers and composition of the poor in 1970 and 1975. Probit analysis was used to estimate the percentage poor of various groups (farm, aged, etc.) on the basis of changes in median income and income distribution from 1948 to 1960. Simple extrapolation was then used to estimate the change in the population for each group. The result is an estimate of the number poor in each group. The paper then examines (1) the results of shifting the poverty cutoff level from $3,000 to $4,000, (2) the effect of population growth, and (3) the effect of more rapid growth in median income. These estimates are also compared with the results of other studies. (Author)

PB-174 449 HC$3.00 MF$0.65

RELATION OF THE IDEA FLOW STUDY TO OTHER RESEARCH ON R AND D ORGANIZATION,

Northwestern Univ., Evanston, Ill. Dept. of Industrial Engineering and Management Sciences.
Jack Seigman. Jun 65, 13p
Grant NSF-G24442
Rept. on Program of Research on the Management of Research and Development.

Descriptors: (*Professional personnel, *Personnel management), Organizations, Industrial research, Management engineering, Behavior, Scientific research, Scientific organizations.

For the idea flow studies, the concept of enculturation is used in relation to idea generating and communicating behavior. The basic question is: 'How do researchers learn to generate ideas which are acceptable to management in achieving organizational goals.' The approach has two parts, one of which is the learning of organizational values, norms and goals; the other is the internalization of the values, norms and goals. Studies were made of the criteria that management uses in accepting an idea, the criteria that researchers perceive management use, and the criteria that researchers use in submitting ideas. (Author)

PB-174 522 HC$3.00 MF$0.65

5J. PSYCHOLOGY (INDIVIDUAL AND GROUP BEHAVIOR)

MONITORING PSYCHOMOTOR RESPONSE TO STRESS BY EVOKED AUDITORY RESPONSES,

School of Aerospace Medicine, Brooks AFB, Tex.
J. A. Freeman. May 65, 17p SAM-TR-65-42

Descriptors: (*Stress (Physiology), Psychomotor tests), (*Central nervous system, Monitors), (*Psychomotor tests, Aviation medicine), (*Pilots, Psychomotor tests), Electroencephalography, Performance (Human), Hypoxia, Acceleration, Sound signals, Auditory signals, Reaction (Psychology), Digital systems, Data storage systems, Digital computers, Performance (Engineering).

A sensitive central nervous system (CNS) monitoring technic that can be correlated with behavior and with changes in the surrounding environment during aerospace flight is desirable to the flight surgeon interested in the early detection of possible adverse effects of the flight on the subject, to the neurophysiologist concerned with basic cerebral mechanisms occurring during the unique conditions of space flight, and to the systems engineer interested in any redundant indirect measurement of environmental parameters which serve to enhance the total system reliability. In this study, a special-purpose digital computer was used to obtain average EEG responses evoked from human subjects by repetitive, nondistracting clicks during sedentary activity, mildly symptomatic hyperventilation, hypoxia, and 2.5 +G sub z acceleration on the SAM human centrifuge and in an NF-100 aircraft. The waveforms obtained were qualitatively distinct for each group. No appreciable alteration of the relative amplitudes or latencies of the individual response components was caused by distraction, habituation, or variations in ambient noise. No significant effects were detectable in the corresponding EEG's. This preliminary investigation suggests that average evoked responses may be useful and sensitive indicators of CNS activity during aerospace flight. (Author)
AD-471 880 HC$3.00 MF$0.65

CYBERNETIC TESTING.
Electronic Systems Div L G Hanscom Field Mass Decision Sciences Lab
For primary bibliographic entry see Field 5I.
AD-650 668 HC$3.00 MF$0.65

EFFECT OF ISOLATION IN A CONSTANT ENVIRONMENT ON PERIODICITY OF PHYSIOLOGICAL FUNCTIONS AND PERFORMANCE.
Naval Submarine Medical Center Groton Conn
For primary bibliographic entry see Field 6P.
AD-650 671 HC$3.00 MF$0.65

ACCURACY AND CONSISTENCY IN THE REVISION OF SUBJECTIVE PROBABILITIES,
Michigan Univ Ann Arbor Inst of Science and Technology
Lee Roy Beach. 1 Aug 65, 9p
Contract AF 19 (628)-2823
Research supported in part by PHS.
Availability: Published in IEEE Transactions on Human Factors in Electronics vHFE7 n1 p29-37 Mar 1966.

Descriptors: (*Psychometrics, *Mathematical models), (*Probability, Accuracy), Theorems, Sampling, Set theory, Mathematical prediction, Training, Reliability, Statistical functions.

Using Bayes' theorem as the normative model, four experiments examined the consistency with which subjective probabilities were revised in light of additional data. Consistency was found to be extremely high under all experimental conditions, and it was shown to be independent of the accuracy of Ss' subjective probabilities; Ss apparently apply a revision rule that is similar to Bayes' theorem to whatever subjective probabilities they possess at the moment regardless of the accuracy of their probabilities.
AD-650 681 Not available from CFSTI.

REVISION OF CONTINUOUS SUBJECTIVE PROBABILITY DISTRIBUTIONS,
Michigan Univ Ann Arbor Inst of Science and Technology
C. R. Peterson, and L. D. Phillips. 20 May 65, 4p
Contract AF 19 (628)-2823
Research supported in part by PHS.
Availability: Published in IEEE Transactions of Human Factors in Electronics vHFE7 n1 p19-22 Mar 1966.

Descriptors: (*Sequences, *Probability), (*Statistical distributions, *Population (Mathematics)), Binomials, Theorems, Statistical analysis, Accuracy, Errors, Graphics, Psychometrics.

Subjects observed sequences of data drawn from binomial populations. After each observation in a data sequence Ss divided the continuum of proportions, from 0 to 1, into three intervals such that each interval was equally likely to contain the population proportion. The boundaries of the subjective intervals were generally quite similar to the corresponding boundaries of the Bayesian posterior distributions, especially after the first few observations in each data sequence. However, a theoretical conservative S, accumulating information at the rate of only one-half datum per observation, also generated boundaries quite near the Bayesian boundaries. This degree of conservatism in the revision of a continuous subjective probability distribution does not preclude a relatively high degree of accuracy in the placement of credible interval boundaries.
AD-650 684 Not available from CFSTI.

INTUITIVE ESTIMATION OF MEANS,
Michigan Univ Ann Arbor
Lee Roy Beach, and Ric md G. Swenson. 1966, 2p
ESD-TR-66-79
Contract AF 19 (628)-2823
Research supported in part by PHS.
Availability: Published in Psychon Sci v5 n4 p161-2 1966.

Descriptors: (*Decision making, Accuracy), Numbers, Errors, Analysis of variance.

Three groups of Ss made intuitive estimates of the means of lists containing 3, 5, and 7 numbers, symmetric and skewed distributions, and low medium, and high variance. Accuracy was found to be extremely high but it decreased as the number of numbers and their variance increased. (Author)
AD-650 686 Not available from CFSTI.

THE SKILLS OF LEADERSHIP,
George Washington Univ Alexandria Va Human Resources Research Office
Joseph A. Olmstead. Apr 67, 14p Rept no. Professional Paper 15-67
Contract DA-44-188-ARO-2
Availability: Published in Military Review v47 n3 p62-70 Mar 1967.

Descriptors: (*Leadership, Effectiveness), Organizations, Supervisory personnel, Military personnel, Attitudes, Motivation, Performance (Human), Behavior, Decision making, Reasoning.

The ultimate criterion of effective leadership can only be the quality of performance demonstrated by an organization's personnel, both individually and as a unit. This means that a commander has failed if he does not improve, or at least maintain, the performance capabilities of the organization entrusted to him. He has failed if he does not influence his personnel to perform the duties assigned to them. Performance remains, of necessity, both the aim and the proof of his leadership. Accordingly, each deliberation of leadership problems, each leadership decision, and each leadership act must have as a first consideration its effect upon performance. When viewed in this way, it is clear that leadership is the process of influencing individuals and organizations to obtain desired results. It is also apparent that the skills required to exercise such influence effectively become highly important. (Author)
AD-650 712 Not available from CFSTI.

SYMPOSIUM ON HUMAN PERFORMANCE QUANTIFICATION IN SYSTEMS EFFECTIVENESS, JANUARY 17-18, 1967, WASHINGTON, D. C. (PROCEEDINGS).
Naval Material Command Washington D C 0900 1967, 338p
Prepared in cooperation with National Academy of Engineering, Washington, D. C.

Descriptors: (*Performance (Human), Naval personnel), (*Systems engineering, Symposia), Effectiveness, Man-machine systems, Naval research, Human engineering, Behavior, Operations research, Simulation, Predictions, 9Computers, Reliability.

The symposium was organized to bring together a group of engineers and scientists from many sections of the country who have been actively investigating the relationship of human operators to the effectiveness of complex man/machine systems. The specific objectives of the symposium were to: review and evaluate current and proposed methods for quantifying man's role in the performance of complex man/machine systems, acquaint the engineering community and particularly scientists and engineers within the Navy with the problems and payoffs related to quantification of human performance in Navy systems, develop a set of recommendations for application by the Naval Material Command and other engineering development organizations to ensure consideration, during all phases of system development, of human contribution to system performance effectiveness. These objectives have been attained through the efforts of those who have conducted research and development activities and reported them here.
AD-650 791 HC$3.00 MF$0.65

STUDY OF TRAINING EQUIPMENT AND INDIVIDUAL DIFFERENCES.
American Institutes for Research in the Behavioral Sciences Palo Alto Calif
For primary bibliographic entry see Field 5I.
AD-650 850 HC$3.00 MF$0.65

RESPONSE TIMES IN DECISION-MAKING TASKS.
Physical sciences research papers no. 300,
Air Force Cambridge Research Labs L G Hanscom Field Mass
Everett F. Dagle, Margaret D. Hill, and William R. Smith. Dec 66, 14p Rept no. AFCRL-66-833
Prepared in cooperation with Xerox Corp., Rochester, N. Y.

Descriptors: (*Decision making, *Reaction (Psychology)), (*Operators (Personnel), Performance (Human)), Accuracy, Sources, Errors, Time, Reliability, Efficiency, Command + control systems.

The extent to which the output in semiautomated systems that utilize human operators is quantitatively and qualitatively accurate is an obvious function of system performance. When assigned to a logical function in a system, the human operator quite often affects total performance; however, little is known about his sources of error, particularly when his response time is concerned. The study presents experimental evidence which supports the hypotheses that human operators differ widely in the time they require to make decisions

and it also provides data that show the degree of consistency or reliability of time measures taken at different times. By using data gathered in the manner outlined in this study, human operators could be matched to command or control systems according to the degree of speed and accuracy required by the particular system. Greater overall efficiency and a maximum output for any given system would be the result.
AD-650 908 HC$3.00 MF$0.65

THE EFFECTS OF DIFFERENTIAL EARLY EXPERIENCE UPON LEARNING, PERFORMANCE, AND BIOCHEMICAL RESPONSES OF NONHUMAN PRIMATES (RHESUS MONKEYS).
Final rept., 1 Apr 65-31 Oct 66,
Florida Presbyterian Coll St Petersburg Neuro-Sciences Lab
W. F. Angermeier, and John B. Phelps. Apr 67, 74p
6571-ARL-TR-67-10
Contract AF 29 (600)-5135

Descriptors: (*Behavior, Primates), Learning, Performance tests, Biochemistry, Stress (Psychology), Reaction (Psychology), Confinement (Psychology), Social psychology, Monkeys.

A study was made to determine the effects of differential early experience upon learning, performance, and biochemical correlates of stress. Twenty-eight male rhesus monkeys from two to four months of age were used for this research. Four social rearing conditions were utilized as follows: (1) strict isolation (2) partial isolation (3) normal laboratory conditions and (4) enriched environment. The study indicated that differential social rearing conditions did not produce differences of performance in animals subjected to extensive match-to-sample training under positive and negative reinforcement conditions. However, the results of this exploration lend support to the hypothesis that biochemical measures constitute an important supplement to the already existing wealth of behavioral data involving various types of stress in nonhuman organisms. (Author)
AD-650 920 HC$3.00 MF$0.65

KEEPING TRACK OF SEQUENTIAL EVENTS: EFFECTS OF STIMULUS ON-TIME AND INTERSTIMULUS OFF-TIME.
Technical memo.,
Human Engineering Labs Aberdeen Proving Ground Md
Harvey A. Taub, Richard A. Monty, and Kenneth R. Laughery. 28 Dec 66, 14p Rept no. HEL-TM-6-67
Prepared in cooperation with Syracuse Veterans Administration Hospital, N. Y., and State Univ. of Buffalo, N. Y. Research supported in part by Cornell Aeronautical Lab., Buffalo, N. Y.
Availability: Published in Perceptual and Motor Skills v24 p159-66 1967.

Descriptors: (*Symbols, *Memory), (*Visual signals, *Psychometrics), Human engineering, Interactions, Performance (Human), Predictions, Errors, Behavior.

Subjects were required to keep track of the number of occurrences of each of four different letters (categories) presented sequentially as a function of the total number of letters presented (trial length), the rate of presentation, and the two components which, when combined, constitute the rate, namely, stimulus on-time and the interstimulus interval or off-time. In general, performance varied inversely with trial length and rate of presentation. Of greater importance, however, was the complex interaction between the rate of presentation and the components of that rate. At the fastest rate, performance was relatively invariant as a function of these components; at intermediate rates the shortest on-time led to the best performance, while at the slowest rate the shortest on-time led to the poorest performance. The observed results are explained primarily in terms of the time available for rehearsal.
AD-650 938 Not available from CFSTI.

A PRIMACY EFFECT IN SUBJECTIVE PROBABILITY REVISION,
Michigan Univ Ann Arbor Inst of Science and Technology
Cameron R. Peterson, and Wesley M. DuCharme. 30 Oct 65, 5p
ESD-TR-65-303
Contract AF 19 (628)-2823
Research supported in part by PHS.
Availability: Published in Journal of Experimental Psychology v73 n1 p61-5 1967.

Descriptors: (*Attitudes, Probability), Decision making, Personality, Reaction (Psychology), Sequential analysis.
Identifiers: Bayes' theorem.

Two experiments presented Ss with sequences of data that 1st favored 1 hypothesis, and then changed to favor a 2nd hypothesis. After each datum Ss became more or less sure of which hypothesis was correct. They reflected this change of opinion with probability estimates, which were compared with probabilities calculated by means of Bayes's theorem. Estimated probabilities changed from favoring the 1st hypothesis to favoring the 2nd hypothesis later than did corresponding Bayesian probabilities. Data that occurred early in a sequence influenced Ss more than did later data--a primacy effect. This result agrees with results of comparable experiments on impression formation. (Author)
AD-650 969 Not available from CFSTI.

ADAPTATION TO THREE TYPES OF WATER-DEPRIVATION SCHEDULES IN THE HOODED RAT,
Syracuse Univ N Y
Charles L. Kutscher. 1966, 2p
Contract DA-49-193-MD-2537
Availability: Published in Psychon. Sci. v5 n1 p37-8 1966.

Descriptors: (*Ingestion (Physiology), Adaptation (Physiology)), Scheduling, Water, Food, Body weight, Behavior, Rats.

Rats allowed a 30 min. or a 180 min. daily drinking period with no food present during this period, showed almost identical daily food intakes and body weight losses even though the latter group drank consistently more during the drinking period than the former. Rats allowed a 180 min. daily drinking period with food present with the water showed higher daily food and water intakes than the other two groups and their body weight stabilized immediately. All groups showed a gradual increase in food and water intake during the 25 days on schedule. (Author)
AD-650 973 Not available from CFSTI.

EFFECT OF HYPERTONIC SALINE INJECTIONS AND WATER DEPRIVATION ON DRINKING, SERUM OSMOLALITY AND GUT WATER,
Syracuse Univ N Y Physiological Psychology Lab
Charles Kutscher. 18 Mar 66, 11p
Contract DA-49-193-MD-2537
Availability: Published in Physiology and Behavior, v1 p259-68 1966.

Descriptors: (*Thirst, Stimulation), Psychophysiology, Ingestion (Physiology), Water, Sodium chloride, Osmotic pressure, Dehydration, Parenteral infusions, Injection (Medicine), Intestines, Urine, Excretion, Behavior, Rats.

Drinking was studied in rats water-deprived 0-60 hr and in satiated rats injected with 8 per cent NaCl by intraperitoneal, intravenous, subcutaneous, subcutaneous with procaine, and intragastric injections. The intraperitoneal injection produced the most drinking in 2 hr and the subcutaneous with procaine and the stomach injection produced the least. Water intakes increased with hr of deprivation. Serum osmolality and water content of the gut were measured in both water-deprived and salt-injected rats. The intraperitoneal and intravenous injections produced increases in serum osmolality as high as that produced by 60 hr of water deprivation, yet the deprived rats drank more than twice as much as the injected rats. The stomach injection produced almost no change in serum osmolality and the 2 subcutaneous injections caused a rise in serum osmolality slightly less than the intraperitoneal and intravenous injections. Both relative and absolute water content of the large and small intestine declined with hr of water deprivation. Salt injections affected relative water content of all the gut segments, but the nature of the change varied with the gut segment and the time after injection. None of the injections produced the loss in absolute gut water caused by 24-60 hr of water deprivation, although several injections produced relative gut water content equal to that produced by 60 hr of water deprivation. The intravenous injection produced a greater urine flow and a more rapid excretion of the salt load than any of the other injections. (Author)
AD-650 974 Not available from CFSTI.

KEEPING TRACK OF SEQUENTIAL EVENTS: IRRELEVANT INFORMATION AND PACED REHEARSAL,
Human Engineering Labs Aberdeen Proving Ground Md
Richard A. Monty, Robert Karsh, and Harvey A. Taub. 9 Dec 66, 11p Rept no. HEL-TM-5-67
Availability: Published in Perceptual and Motor Skills, v24 p99-103 1967.

Descriptors: (*Psychometrics, *Human engineering), (*Visual signals, Performance (Human)), Memory, Sequences, Errors, Recall, Interactions.

The effects of irrelevant information on subjects' ability to keep track of a changing situation mentally were examined. It appears that, when relevant stimuli are presented at an irregular rate of presentation, irrelevant stimuli interspersed with the relevant stimuli may enable subjects to pace rehearsal of the current state of the changing situation in a fashion that reduces the interference effects of the irregular rate of presentation.
AD-650 997 Not available from CFSTI.

TEMPORAL PATTERNS OF SIGNALS AND VIGILANCE PERFORMANCE.
Human Factors Research Inc Goleta Calif
For primary bibliographic entry see Field 5E.
AD-651 047 HC$3.00 MF$0.65

ELECTROPULSE RESPONSIVITY TO CHANGES IN SKIN MOISTURE,
George Washington Univ Alexandria Va Human Resources Research Office
R. L. Brown, R. Spern, and A. Solomon. 1 Feb 67, 9p Rept no. Professional Paper-16-67
Contract DA-44-188-ARO-2
Availability: Published in Perceptual and Motor Skills v24 n1 p303-8 Feb 1967.

Descriptors: (*Touch, Communication systems), Skin, Moisture, Sensitivity, Perspiration, Reaction (Psychology), Electrophysiology, Accuracy, Thresholds (Physiology).

Twelve Ss were exposed to electropulse stimulation under 3 moisture treatments: dry, water immersion, and a fluid approximation of sweat. Touch threshold data were obtained under these conditions during the first half of the experiment and electropulse recognition responses during the second half. A significant threshold rise occurred with increased amounts of moisture on the skin. Similarly, recognition accuracy decreased but re-

mained within a 90 to 100% range. Human engineering implications pertinent to a tactual communication system were discussed. (Author)
AD-651 053 Not available from CFSTI.

AN ATAXIA TEST BATTERY NOT REQUIRING THE USE OF RAILS.
Naval Aerospace Medical Inst Pensacola Fla
For primary bibliographic entry see Field 6P.
AD-651 057 HC$3.00 MF$0.65

THE IMPORTANCE OF THE DATA-GENERATING MODEL IN PROBABILITY ESTIMATION,
Rand Corp Santa Monica Calif
Sarah Lichtenstein, and George J. Fenney. Apr 67, 15p Rept no. P-3579
Prepared in cooperation with Oregon Research nstitute and General Electric Company.

Descriptors: (*Decision making, Probability), Performance (Human), Accuracy, Data.

When subjects appear to do poorly in a complex probability estimation task, they may be making careful estimates based on a different data-generating model than the one used by the experimenters. Eleven subjects estimated for 150 trials the probability that a dropped 'bomb' had been aimed at one of two cities. Correlations between subjects' estimates and probabilities generated by the correct, circular normal model and by a simple, incorrect ratio of distances model showed six subjects using the wrong model with great accuracy. The usual analysis of such data, in which a possible confusion about the data-generation model is disregarded, would have led to the misleading conclusion that these subjects were very inaccurate at the task. (Author)
AD-651 108 HC$3.00 MF$0.65

RESULTS FOR AN ADDITIONAL FOLLOW-UP CRITERION ON A SAMPLE OF AIR FORCE SCIENTISTS,
Utah Univ Salt Lake City
For primary bibliographic entry see Field 5I.
AD-651 119 HC$3.00 MF$0.65

APPLICATION OF INFORMATION THEORY TO THE NERVOUS SYSTEM.
Chicago Univ Ill Committee on Mathematical Biology
For primary bibliographic entry see Field 6P.
AD-651 123 HC$3.00 MF$0.65

STUDIES OF BINAURAL INTERACTION.
Summary rept.,
Tracor Inc Austin Tex
W. T. Bourbon, and T. R. Evans. 1 Apr 67, 83p Rept no. TRACOR-67-372-U
Contract Nonr-4193 (00)

Descriptors: (*Auditory perception, *Psychoacoustics), Auditory signals, Detection, Stimulation, Hearing, Thresholds (Physiology), Audiometry, Azimuth, Signal-to-noise ratio, Probability, Psychophysics.

The series of basic studies in binaural interaction continued with emphasis on two areas of investigation: Manipulation of observers' criterion in auditory detection and critical bands of tonal stimuli. Work on a third area, detectability of tonal signals under conditions of azimuth certainty was also continued.
AD-651 145 HC$3.00 MF$0.65

RECENT RESEARCH DIRECTED TOWARD THE PREDICTION OF LATERAL-DIRECTIONAL HANDLING QUALITIES.
National Aeronautics and Space Administration. Flight Research Center, Edwards, Calif.
For primary bibliographic entry see Field 1D.
For abstract, see STAR 05 11.
N67-23242 HC$3.00 MF$0.65

5K. SOCIOLOGY

SYSTEM LINKAGES AMONG WOMEN'S ORGANIZATIONS: AN EXPLORATORY STUDY OF MEMBERSHIP AND LEADERSHIP LINKAGES AMONG WOMEN'S FORMAL ORGANIZATIONS IN A LOCAL COMMUNITY.
Final rept.,
Iowa State Univ Ames Dept of Sociology and Anthropology
George M. Beal, Gerald E. Klonglan, Paul Yarbrough, Joe M. Bohlen, and Don A. Dillman. 1967, 143p Rept no. Rural Sociology-42
Contract OCD-PS-65-9

Descriptors: (*Organizations, *Social sciences), Leadership, Sociology, Females, Humans, Civil defense systems, Attitudes, Behavior, Social psychology, Rural areas.

The local Civil Defense Director is conceptualized as a change agent with the task of instigating social change. In local communities voluntary organizations, conceptualized as social systems, are potential resources which a change agent may utilize in various ways to instigate social change. The voluntary organizations in a single local community have various relationships extant between them which may impinge upon attempts to involve them in social change efforts. One of these relationships is that of structural system linkage, i.e. overlapping memberships with or without accompanying leadership responsibilities or qualities. Four types of structural system linkages are analyzed in this report: member to member linkage, member to officer linkage, member to organizational influential linkage and member to community influential linkage. Definite patterns of member to member linkages and member to leader linkages existed among the 41 study organizations. Clusters of organizations were delineated on the basis of the patterning of member to member linkages. The patterns of member to leader linkages differed from that of the member to member linkages. In terms of potential influence, operationalized as a structural concept, it was found that the organizations of certain clusters had greater potential influence over community organizations than did others. Implications of the findings for change agents and future research are drawn from the conclusions. (Author)
AD-651 049 HC$3.00 MF$0.65

URBAN NODE IN THE INFORMATION NETWORK,
Rand Corp Santa Monica Calif
For primary bibliograp ic entry see Field 13B.
AD-651 109 Not available from CFSTI.

RESETTLEMENT IN LATIN AMERICA: AN ANALYSIS OF 35 CASES,
American Univ Washington D C Center for Research in Social Systems
For primary bibliographic entry see Field 5A.
AD-651 116 HC$3.00 MF$0.65

PRELIMINARY PLANNING TOURIST FACILITIES ALABAMA - COUSHATTA INDIAN RESERVATION, POLK COUNTY, TEXAS.
Brown and Root, Inc., Houston, Tex.
For primary bibliographic entry see Field 5C.
PB-174 466 HC$3.00 MF$0.65

NATIONAL ARTS CENTER PROJECT FEASIBILITY STUDY.
Indiana Univ. Foundation, Bloomington.
For primary bibliographic entry see Field 5C.
PB-174 469 HC$3.00 MF$0.65

TOURIST-RECREATION POTENTIAL IN THE KATAHDIN VALLEY AREA, MAINE.
Technical Planning Associates, New Haven, Conn.
For primary bibliographic entry see Field 5C.
PB-174 472 HC$3.00 MF$0.65

SKIING TRENDS AND OPPORTUNITIES IN THE WESTERN STATES.
Intermountain Forest and Range Experiment Station, Ogden, Utah.
For primary bibliographic entry see Field 5C.
PB-174 473 HC$3.00 MF$0.65

SUCCESSFUL PRIVATE CAMPGROUNDS,
Northeastern Forest Experiment Station, Upper Darby, Pa.
For primary bibliographic entry see Field 5C.
PB-174 581 HC$3.00 MF$0.65

6. BIOLOGICAL AND MEDICAL SCIENCES

6A. BIOCHEMISTRY

EFFECTS OF NITROGEN SUPPLEMENTS ON NITROGEN FIXATION BY AEROBACTER AEROGENES,
South Dakota State Univ Brookings Dept of Bacteriology
For primary bibliographic entry see Field 6M.
AD-650 721 Not available from CFSTI.

RELEASE OF CHEMICAL FACTORS FROM THE DIENCEPHALIC REGION OF THE UNANAESTHETIZED MONKEY DURING CHANGES IN BODY TEMPERATURE,
Purdue Univ Lafayette Ind Lab of Neuropsychology
For primary bibliographic entry see Field 6P.
AD-650 733 Not available from CFSTI.

THE SOLUBILIZATION OF DEOXYHEMOGLOBIN S,
State Univ of New York Stony Brook Dept of Chemistry
Edward M. Kosower, Nechama S. Kosower, and Patricia C. LaCourse. 29 Nov 66, 8p
AROD-4899:1
Grant DA-ARO (D)-31-124-G606
Availability: Published in Proceedings of the National Academy of Sciences v57 n1 p39-43 Jan 1967.

Descriptors: (*Hemoglobin, Solubility), Blood diseases, Glutamic acid, Proteins, Transformations, Anemias, Electrophoresis.

It is suggested that the introduction of glutamic acid residues into Hb S might diminish the ease of gel formation of the deoxyHb S in the red blood cell. They report that the solubility of HbS can be augmented in the predicted way. Glutamic acid residues can be introduced by reaction of the protein with the N-carboxyanhydride of glutamic acid. With a sufficient number of added glutamic acid moieties, the solubility of the modified deoxyHb S exceeds that of deoxyHb A (normal hemoglobin). (Author)
AD-650 757 Not available from CFSTI.

THE FREE AMINO ACIDS IN THE PLASMA AND URINE OF HUMAN SUBJECTS ON A VITAMIN B6-DEFICIENT DIET,
Army Medical Research and Nutrition Lab Denver Colo
Richard S. Harding, Howerde E. Sauberlich, and John E. Canham. 1966. 5p

Presented at the Technion Symposium, Automation in Analytical Chemistry, New York, N. Y., 8 Sep 65.
Availability: Published in Unidentified Journal.

Descriptors: (*Amino acids, Metabolism), (*Deficiency diseases, *Vitamin B complex), Enzymes, Catalysis, Blood plasma, Urine, Excretion, Diet.

The effects of vitamin B6 deficiency on the catalysis of enzyme systems requiring pyridoxal phosphate are reflected in altered patterns of free amino acids in the plasma and urine of human subjects subsisting on either a high or low protein diet. This functional significance of vitamin B6 in amino acid metabolism is evident, not only in the changes evoked during the vitamin deficiency state on the plasma and urine levels of taurine, glycine, alanine, asparagine-glutamine and others, but also in the depression of the total molar values and the essential to nonessential amino acid ratios. (Author)
AD-650 767 Not available from CFSTI.

EFFECT OF HYPERBARIC OXYGENATION IN VITRO ON MAMMALIAN RESPIRATORY CHAIN-LINKED DEHYDROGENASES,
Maryland Univ Baltimore Dept of Surgery
Sadayoshi Hashimoto, Setsu Komatsu, Elwood H. LaBrosse, and R. Adams Cowley. 1966, 10p
Contract DA-49-193-MD-2229, Grant PHS-HE-07898-03
Availability: Published in International Conference on Hyperbaric Medicine (3rd), National Academy of Sciences, Washington, D. C., p52-60.

Descriptors: (*Oxygen, Toxicity), (*Oxidoreductases, Respiratory system), Pressure breathing, Succinates, Thiols, Chelate compounds, Reaction kinetics, Mitochondria, Mammals, Cytochemistry.
Identifiers: OHP.

The effect of OHP on the enzymatic activity (especially initial reaction rates) of the mammalian respiratory chainlinked dehydrogenases (succinic dehydrogenase, alpha-L-glycerophosphate dehydrogenase, NADH dehydrogenase, and choline dehydrogenase) in both particulate and soluble preparations was studied. Oxygen at a pressure of 3 atm for 1-3 hours and 5 atm for 1-2 hours had no significant effect on the particulate preparations, while in soluble succinic dehydrogenase preparations the rate of inactivation was proportional to the oxygen pressure under the same exposure conditions. The protection by succinate reported for the particulate preparations under OHP was not found in soluble succinic dehydrogenase preparations. The iron-chelating agents (alpha, alpha prime-dipyridyl and o-phenanthroline) partially protected against inactivation of the enzyme by OHP, while SH-protecting agents (reduced glutathione and dithiothreitol), riboflavin-5'-phosphate, and EDTA has rather detrimental effects. (Author)
AD-650 785 Not available from CFSTI.

EFFECT OF NOBLE-COLLIP DRUM SHOCK ON RESPIRATORY CONTROL IN RAT LIVER AND KIDNEY MITOCHONDRIA,
Maryland Univ Baltimore Clinical Shock Unit
Setsu Komatsu, Sadayoshi Hashimoto, Elwood H. LaBrosse, Harutada Ninomiya, and R. Adams Cowley. 1966, 6p
Contract DA-49-193-MD-2229
Availability: Published in The American Surgeon v33 n2 p159-64 Feb 1967.

Descriptors: (*Cytochemistry, *Shock (Pathology)), Mitochondria, Oxygen consumption, Liver, Kidneys, Pyruvates, Glutamic acid, Glutaric acids, Succinates, Adenosine phosphates, Respiration.

The influence of 4 different substrates, glutamate, pyruvate, alpha-ketoglutarate and succinate, alone and with added adenosine diphosphate (ADP) on the oxygen uptake of rat liver and kidney mitochondria was studied. The mitochondria were isolated from the livers and kidneys of rats which were subjected to traumatic shock using the Noble-Collip drum and from normal rats. There is no significant difference between control and shock groups following the addition of substrate alone. When pyruvate is the substrate there is a significant prolongation in the time required for oxygen uptake following the addition of ADP for the mitochondria from the shocked rats. There are significant differences between the respiratory control ratios (rate of oxygen uptake immediately after adding ADP/rate after the ADP effect has disappeared) of the control and shock groups for each of the substrates. These results indicate that traumatic shock, and possibly other types of shock, produces a detrimental effect at the mitochondrial level and, therefore, suggest that at least a part of the effort to understand the mechanism of shock, as well as its treatment, should be directed toward the subcellular level. (Author)
AD-650 788 Not available from CFSTI.

PROTEIN BINDING OF SMALL IONS- A MATHEMATICAL MODEL OF SERUM ALBUMIN,
Rand Corp Santa Monica Calif
E. C. DeLand, and Rose Heirschfeldt. Apr 67, 53p Rept no. RM-5254-PR
Contract F44620-67-C-0045

Descriptors: (*Serum albumin, Mathematical models), Hydrogen, Chlorides, Calcium, Ions, Molecular structure, Theory, Proteins, Blood chemistry, Chemical bonds, Molecular association, Models (Simulations).

This Memorandum examines the role of serum albumin with respect to the binding of H (+), Cl (-) and Ca (++). The point of view, following much of the literature, is that the Linderstrom-Lang theory--which treats the molecule as a charged sphere--can explain the anomalous behavior of serum a umin in acidity regions remote from the isoionic point. But it is shown, first for H (+) and then for Cl (-) and Ca (++), that while the charged sphere concept can be stretched to fit the laboratory data, the consequent Debye-Huckel parameter bears little relation to the predicted values. The fairly exact calculations of simultaneous events possible with the computer leaves little room for doubt that a much improved theory must be developed. In fact, one conclusion is that this theory is only approximate and that an adequate explanation probably will have to begin with the exact geometry of the molecule and the consequent intramolecular interactions. This latter procedure is almost possible today--with increasing knowledge of molecular structure--whereas it was not when the former theory was promulgated. (Author)
AD-650 817 HC$3.00 MF$0.65

SURFACE BEHAVIOR OF INDIVIDUAL LIPIDS SIMILAR TO CONSTITUENTS OF PULMONARY SURFACTANT.
Technical rept., Sep 65-Jan 66,
Edgewood Arsenal Md Medical Research Lab
M. J. Mastrangelo, W. P. Giordano, and R. P. Johnson. Apr 67, 24p
EATR-4087

Descriptors: (*Lungs, *Surface-active substances), (*Lipids, Surface-active substances), (*Phospholipids, Surface-active substances), Molecular structure, Compressive properties, Surface tension, Concentration (Chemistry), Hysteresis, Fatty acids.

Surface films of amphipathic neutral lipids and phospholipids, similar to those found in pulmonary surfactant, were characterized by their surface behavior, including that under high surface pressure. Each lipid was studied with respect to equilibrium point, hysteresis hypercompressibility, and isotension point, the last two being newly defined parameters. It was found that saturated (straight) hydrocarbon chain molecules exhibited much lower isotension-point surface tensions than did their respective unsaturated (branched) analogs, whereas the reverse was true for the equilibrium-point surface tensions. Saturated compounds exhibited considerably more hypercompressibility than did their unsaturated analogs. The ordering of limiting surface tension at highest compression (the isotension point) was not exclusively dependent on obvious steric factors; rather, subtle and undefined electronic factors were also participating. The significantly lowest surface tensions obtained on compression were exhibited by dipalmitoyl lecithin, sphingomyelin, and palmitic acid. The last compound demonstrates that lipids other than phospholipids can exhibit surface activity similar to pulmonary surfactant. Development of post-isotension-point hysteresis was limited to the saturated class of molecules tested. (Author)
AD-651 001 HC$3.00 MF$0.65

ASCORBIC ACID METABOLISM IN MAN,
Army Medical Research and Nutrition Lab Denver Colo
For primary bibliographic entry see Field 6P.
AD-651 012 Not available from CFSTI.

INFLUENCE OF DIETARY LITHOCHOLIC ACID ON HEPATIC LIPID TRANSPORT,
Army Medical Research and Nutrition Lab Denver Colo
For primary bibliographic entry see Field 6P.
AD-651 016 Not available from CFSTI.

LACK OF EFFECT OF DIETARY CHENODEOXYCHOLIC ACID ON PLASMA AND LIVER LIPIDS AND THE DUCTULAR CELL REACTION IN THE CHICK,
Army Medical Research and Nutrition Lab Denver Colo
For primary bibliographic entry see Field 6P.
AD-651 018 Not available from CFSTI.

LIPOGENESIS AND ENZYME ACTIVITY IN RAT AND MOUSE EPIDIDYMAL ADIPOSE TISSUE,
Army Medical Research and Nutrition Lab Denver Colo
For primary bibliographic entry see Field 6P.
AD-651 019 Not available from CFSTI.

PROLONGED GLUTEN ADMINISTRATION IN NORMAL SUBJECTS,
Army Medical Research and Nutrition Lab Denver Colo
For primary bibliographic entry see Field 6P.
AD-651 025 Not available from CFSTI.

ZINC LEVELS AND BLOOD ENZYME ACTIVITIES IN EGYPTIAN MALE SUBJECTS WITH RETARDED GROWTH AND SEXUAL DEVELOPMENT,
Naval Medical Research Inst Bethesda Md 2106
For primary bibliographic entry see Field 6E.
AD-651 054 Not available from CFSTI.

A NEW GLYCOLIPID SULFATE ESTER IN HALOBACTERIUM CUTIRUBRUM,
National Research Council of Canada Ottawa (Ontario) Div of Biosciences
M. Kates, B. Palameta, M. P. Perry, and G. A. Adams. 7 Oct 66, 4p
NRC-9342
Availability: Published in Biochimica et Biophysica Acta v137 p213-6 1967.

Descriptors: (*Lipids, Bacteria), Glycosides, Sulfates, Esters, Chromatographic analysis, Purification, Absorption spectrum, Chemical analysis, Degradation, Stereochemistry.
Identifiers: Halobacterium cutirubrum.

On the basis of the analytical and degradative data, it is postulated that the glycolipid-sulfate ester in H. cutirubrum has one of the two following structures: (a) -O - SO2 - O - 3-Gal- (1 yields 6)-Man-(1 yields 2)-Glu- (1 yields 1') - 2',3'-di-O-phytanyl-L-glycerol, or (b) -O - SO2 - O - 3-Gal- (1 yields 2)-Glu- (1 yields 6)-Man- (1 yields 1') - 2',3'-di-O-phytanyl-L-glycerol. Further degradative studies are required to determine which of the structures (a) or (b) is the correct one. The configuration of the sugars and the stereochemical designation of the glycosidic linkages also remain to be determined. However, the high dextrorotary optical activity of the glycolipid-sulfate suggests that the glycosidic linkages have the alpha-configuration. (Author)
AD-651 165 Not available from CFSTI.

DETERMINATION OF MOLECULAR WEIGHT BY USING AN ANALYTICAL ULTRACENTRIFUGE.
Army Biological Labs Frederick Md
For primary bibliographic entry see Field 7D.
AD-651 169 HC$3.00 MF$0.65

THE VITALITY OF FLUORESCENCE MICROSCOPIC INVESTIGATIONS CARRIED OUT WITH THE HELP OF THE FLUOROCHROMES OF ACRIDINE ORANGE AND 3,4 BENZPYRENE.
Army Biological Center Frederick Md
E. A. Lyapunova, S. B. Petrikevich, and A. V. Zelenin. 24 Nov 64, 11p Rept no. Trans-1937 TT-67-61712
Trans. of Akademiya Nauk SSSR. Izvestiya. Seriya Biologicheskaya, v30 n6 p928-32 1965.

Descriptors: (*Cytochemistry, Fluorescence), Acridines, Polycyclic compounds, Biological stains, Visual inspection, Metabolism, Viability, Cell structure, Lipids, Mitosis, Proteins, Biosynthesis, Nucleic acids, Autoradiography, USSR.
Identifiers: Benzopyrenes.

Cytoiogical and autoradiographic methods were used to investigate the degree of vitality of certain types of fluorescence microscopic investigation of living cells. On the basis of tests, carried out with acridine orange fluorochrome, a classification is proposed for the types of fluorescence microscopic investigation: Vital (fluorochrome hardly reflected in the metabolism and viability of the cell); supravital (fluorochromed cell preserves the majority of features of a living cell, but not all of them, in particular such a treatment of cells with acridine orange leads to inhibition of protein syothesis); pseudovital (the cell dies as a result of the action of fluorochrome). It was established that when working with a culture of cells of amniotic epithelium (strain FL), acridine orange in a concentration of 0.3--0.5 micrograms/ml makes it possible to conduct a vital study, and in a concentration of 10--20 micrograms/ml a supravital study of the cells. With the help of 3,4-benzpyrene in a concentration of 15--25 micrograms/ml it is possible to make a vital investigation of the distribution of lipids in the same cells. The stated concentrations refer to cells which have been shielded from the action of light. (Author)
AD-651 178 HC$3.00 MF$0.65

SYNTHESIS OF ALKYL 2-CYANOPROPIONATES AND MEASUREMENT OF THEIR SPREADING COEFFICIENTS ON 1% AQUEOUS CASEIN AND ON WATER.
Walter Reed Army Medical Center Washington D C Army Medical Biomechanical Research Lab
For primary bibliographic entry see Field 11A.
AD-651 209 HC$3.00 MF$0.65

CHEMISTRY OF LIVING SYSTEMS SEMIANNUAL REPORT, 1 OCT. 1966 - 31 MAR. 1967.
California Univ., Berkeley. Space Sciences Lab.
T. H. Jukes. 31 Mar 67, 26p NASA-CR-83321 Grant NSG-479
Its Space Sci. Lab. Ser. No. 8, Issue No. 24

Descriptors: *Bacteriophage, *Biochemistry, *Enzyme, *Life science, *Pseudomona, *Ribonucleic acid (rna), Acid, Biogeny, Dna, Escherichia, Evolution, Germination, Life, Mechanism, Metabolism, Molecular, Organism, Protein, Ribonucleic, Science, Spinach, Synthesis.

For abstract, see STAR 05 11.
N67-22380 HC$3.00 MF$0.65

ON THE ACID AND ALKALINE DENATURATION OF DNA AND ITS DEPENDENCE ON THE SALT CONCENTRATION.
Istituto Superiore Di Sanita, Rome (Italy). Laboratori Di Fisica.
E. Dore, and C. Frontali. 26 Sep 66, 16p ISS-66/33
Sponsored By the Comiglionazl. Delle Ric.

Descriptors: *Deoxyribonucleic acid (dna), *Ph, *Salt, Acid, Alkali, Concentration, Conductivity, Electric, Ion, Map, Molecular, Weight.

For abstract, see STAR 05 11.
N67-23087 HC$3.00 MF$0.65

SYNTHESES DE L'ACIDE DELTA AMINOLEVULIQUE APPLICATION A L'INTRODUCTION DE CARBONE 14 ET DE TRITIUM (Synthesis of Delta-Aminolevulic Acid. Application to the Introduction of Carbon-14 and of Tritium).
Commissariat a l'Energie Atomique, Saclay (France). Centre d'Etudes Nucleaires.
For primary bibliographic entry see Field 7E.
PB-174 564 HC$3.00 MF$0.65

6B. BIOENGINEERING

FURTHER DEVELOPMENT OF THE BIOTHERMAL ANALOG COMPUTER.
Final rept., Feb 63-Jan 66,
Washington Univ Seattle Dept of Physiology and Biophysics
Arthur C. Brown. Dec 66, 67p
AMRL-TR-66-197
Contract AF 33 (657)-10838
See also AD-428 144.

Descriptors: (*Body temperature, Models (Simulations)), Mathematical models, Analog computers, Distribution, Humans, Simulators, Metabolism, Respiration, Thermal insulation, Clothing, Temperature control, Analysis of variance, Responses, Stress (Physiology), Heat tolerance.
Identifiers: Homeostasis.

An electronic analog computer, designed to enable calculation of the response of man to thermal stress, was developed. In accordance with equations previously developed (c.f. AD-428 144), the computer circuits were used to simulate the physical distribution of heat within the body, the thermal stress imposed by the environment, and the physiological mechanisms of homeostatic feedback. Computer predictions were compared with experimental results from cyclic thermal stresses furnished by Lieutenant Colonel W. C. Kaufman, AMRL, and agreement was found to be good. The computer was used to calculate human response to wearing of an unventilated anti-exposure suit. The technical aspects of the computer circuits are presented in detail. (Author)
AD-650 729 HC$3.00 MF$0.65

JET SHOES - AN EXTRAVEHICULAR SPACE LOCOMOTION DEVICE.
National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
J. D. Bird, R. F. Hellbaum, and D. F. Thomas, Jr.. Mar 67, 33p NASA-TN-D-3809 Contract 749-51-05-01-23
Technical Film Supplement L-892 Available on Observations 1966 P 116-119 (See N67-

Descriptors: *Astronaut locomotion, *Extravehicular operation, *Shoe, Astronaut, Attitude, Control, Device, Jet, Locomotion, Motion, Rotation, Thrust, Translation, Vector.

For abstract, see STAR 05 11.
N67-21961 HC$3.00 MF$0.65

LUNAR SAMPLE RECEIVING LABORATORY GLOVE SYSTEM INTERIM MONTHLY PROGRESS REPORT, OCT. 1966 - JAN. 1967.
Litton Systems, Inc., Beverly Hills, Calif. Space Sciences Labs.
Feb 67, 27p NASA-CR-65605, MPR-9
Contract NAS9-5872

Descriptors: *Astronaut locomotion, *Pressurized suit, *Space suit, Arm, Assurance, Astronaut, Design, Fabrication, Glove, Pressure, Protection, Quality, Space, Suit, Testing.

For abstract, see STAR 05 11.
N67-23327 HC$3.00 MF$0.65

6C. BIOLOGY

A HISTOLOGICAL STUDY OF THE CHIMPANZEE EYE.
Final rept., Sep 62-Nov 66,
Tufts Univ Medford Mass Dept of Biology
Russell L. Carpenter. Mar 67, 82p
6571-ARL-TR-67-9
Contract AF 29 (600)-3554

Descriptors: (*Eye, Histology), (*Chimpanzees, Eye), Anatomy, Humans, Cornea, Retina, Optic nerve, Aging (Physiology).

Thirteen eyes of normal chimpanzees from 1-3/4 to 15 years of age were serially sectioned for histological study. No significant differences related to age could be identified. The chimpanzee eye corresponds closely to the human eye, the chief differences being related to the structures of the anterior chamber angle. Although basically similar to the human, they appear to represent a stage in evolutionary development somewhat less advanced. The canal of Schlemm is a larger and more irregular channel than the human canal, with its endothelial lining interrupted so that its lumen becomes continuous with the trabecular spaces. The scleral trabeculae are of two kinds, coarse and fine. The coarse ones are like the human scleral trabeculae but are fewer. The fine trabeculae are continuous with the delicate fibrous stroma of the ciliary body which extends between the circular muscle fibers and the longitudinal and oblique fibers, thus filling in the vestigial ciliary cleft. The fine fibers resemble those occupying the chamber angle of the human foetus eye before their atrophy deepens the angle. The uveal trabeculae are histologically identical to those of the human eye but are more numerous and nearly twice their diameter. They collectively correspond to the pectinate ligament of lower mammals. The suprachoroidal lamellae are networks of flat branching elastic trabeculae bearing pigment cells. Although this differs from the usual description of the human suprachoroidea, re-examination of human preparations discloses no difference between human and chimpanzee. (Author)
AD-650 566 HC$3.00 MF$0.65

MINIATURE ALLIGATOR CLIPS AS FISH TAGS.
Montana State Univ Bozeman Dept of Zoology and Entomology
J. D. McCleave, L. A. Jahn, and C. J. D. Brown. 1967, 3p
Contract Nonr-4840 (00), Grant NSF-GB-3512

Availability: Published in Progressive Fish-Culturist v29 n1 p60-1 Jan 1967.

Descriptors: (*Fishes, Labels), Identification, Colors, Tracking, Ecology.

Studies on homing and orientation of the Cutthroat Trout (Salmo clarki) required a short-term tagging method which would be rapid, minimize handling, eliminate need for an anesthetic, and use a tag easily recognized in a trap full of fish. Cadmium-plated steel alligator clips, 28- by 5-millimeter, called mini-gators (Mueller Type 30), were used. These can be obtained from electronics mail-order firms for 3.2 cents each in quantity. Coding was done by attaching the clips to a firm support and painting with one or two colors of aerosol-spray enamel. In this way an entire lot of tags was marked at once. A mini-gator clip was attached to the posterior edge of a dorsal fin at its base, with the long axis of the clip resting on the dorsal surface. The tags were used to mark 599 cutthroat trout measuring 200 to 425 millimeters in total length. (Author)
AD-650 626 Not available from CFSTI.

THE ROLE OF FUR IN HEAT REGULATION IN THE GUINEA PIG,
Delaware Univ Newark
Richard D. Gilchrist, and Charles G. Wilber. 23 Apr 66, 2p
Contract AF 41 (609)-2700
Prepared in cooperation with Kent State Univ., Ohio.
Availability: Published in Ohio Journal of Science v67 n1 p8-9 Jan 1967.

Descriptors: (*Body temperature, *Guinea pigs), (*Fur, Body temperature), Heat production (Biology), Thermal insulation, Effectiveness.

The results of this study indicate that guinea pig fur plays an important role in decreasing heat dissipation and that the fur is an important factor in maintaining this species' homeothermic balance. This study of the insulating value of fur and skin in guinea pigs shows differences between live guinea pigs with intact coats and with clipped fur, dead guinea pigs with intact coats and with clipped fur, and dead, skinned guinea pigs when exposed in a chamber held at 6C. Live animals with intact coats lost heat most slowly; dead, skinned animals lost heat most rapidly; rates of heat loss in others were intermediate. (Author)
AD-650 673 Not available from CFSTI.

HEREDITARY TRANSMISSION OF PLAGUE RESISTANCE IN PALLASIOMYS MERIDANUS,
Army Biological Labs Frederick Md
M. I. Levi. 10 Aug 64, 10p Rept no. Trans-1182
TT-67-61623
Trans. of Byulleten Eksperimentalnoi Biologii i Meditsiny (USSR), v55 n7 p75-9 1963.

Descriptors: (*Pasteurella pestis, Resistance (Biological)), (*Rodents, Pasteurella pestis), Diseases, Genetics, Experimental design, Septicemia, Infections, USSR.

In comparative experiments it has been possible to establish essential differences in the extent of resistance to plague in noon jerboas inhabitating the left and right banks of the Volga, and also related differences in the pathogenesis of the infection. When the subcutaneous method of infection is used the LB50 for left-bank noon jerboas exceeded the LB50 for right-bank jerboas by several dozens of thousands or hundreds of thousands of times. The geographical isolation of the right-bank and left-bank noon jerboas is not subject to doubt. In this report the effect of genetic factors on the formation of plague resistance in left-bank noon day jerboas was studied. (Author)
AD-650 889 HC$3.00 MF$0.65

OBSERVATIONS ON THE ROLE OF THE REACTIVITY OF GREAT GERBILS TO P. PESTIS DURING THE DEVELOPMENT OF THE EPIZOOTOLOGICAL PROCESS. IV. EXPERIENCE IN USING THE PASSIVE HEMAGGLUTINATION REACTION IN A STUDY OF THE NATURAL PLAGUE FOCUS IN THE MUYUN KUM,
Armed Forces-Nrc Committee on Bio-Astronautics Washington D C
L. A. Peisakhis, A. G. Stogova, K. M. Muminov, G. Yu. Pak, and G. I. Kisselev. Apr 66, 5p Rept no. Trans-1681
TT-67-61625
Trans. of Nauchnaya Konferentsiya po Prirodnoi Ochagovosti i Profilaktike Chumy, Alma Ata, Feb 63. Materialy, n.p. p178-80.

Descriptors: (*Pasteurella pestis, Disease vectors), (*Rodents, Pasteurella pestis), Diseases, Serodiagnosis, Antigens + antibodies, USSR.

It is considered that the passive hemagglutination reaction is completely suitable for directed searches for the plague microbe and should enter into the complex of methods for the field diagnosis of plague. It should be carried out by qualified specialists in a known enzootic territory, in various phases of the epizootic process and with variations in the volume of rodents investigated for the presence of the plague microbe and their sera for the presence of antibodies. A similar type of investigations will apparently lead in the end result to an establishment of the necessary quantitative forms for the investigation of carriers for the isolation of the plague causative agent in various phases of the epizootic process and particularly in the period of depression. (Author)
AD-650 891 HC$3.00 MF$0.65

ARTHROPODS OF MEDICAL IMPORTANCE IN AFRICA. PART I. INTRODUCTORY AND EXPLANATORY MATERIAL DATA ON MOSQUITOES,
Army Natick Labs Mass Earth Sciences Div
B. V. Travis, C. E. Mendoza, and R. M. Labadan. Feb 67, 384p Rept no. ES-31-Pt-1
USA-NLABS-TR-67-55-ES-Pt-1
See also AD-650 949, Part II.

Descriptors: (*Arthropods, Africa), Culicidae, Insects, Entomology, Diseases, Disease vectors, Distribution, Behavior, Military medicine.

The occurrence of insects and other arthropods of medical importance in Africa is summarized on the basis of a compilation of all available references in the scientific literature. The report includes, for each major group of arthropods, a listing of species and subspecies with biological and distributional data, tabulations of diseases or disease organisms transmitted, and complete literature citations. The groups of arthropods included, with the number of species or subspecies in parentheses, are: Part I: Mosquitoes (1037); Part II AD-650 949:9 Arthropods other than mosquitoes: Black flies (103), Sand flies (269), Midges (177), Horse flies (1080), Biting flies (67), Non-biting flies (50), Fleas (363), Bugs (24), Urticating and vesicating arthropods (9), Ticks (424), Mites (26), and Miscellaneous arthropods (33). (Author)
AD-650 931 HC$3.00 MF$0.65

ARTHRODPODS OF MEDICAL IMPORTANCE IN AFRICA. PART II. DATA ON ARTHROPODS OTHER THAN MOSQUITOES,
Army Natick Labs Mass Earth Sciences Div
B. V. Travis, C. E. Mendoza, and R. M. Labadan. Feb 67, 464p Rept no. ES-31-pt-2
USA-NLABS-TR-67-55-ES-Pt-2
See also AD-650 931, part I.

Descriptors: (*Arthropods, Africa), Insects, Entomology, Diseases, Disease vectors, Distribution, Behavior, Musca, Siphonaptera, Diptera, Mites, Ticks, Military medicine.

The occurrence of insects and other arthropods of medical importance in Africa is summarized on the basis of a compilation of all available references in the scientific literature. The report includes, for each major group of arthropods, a listing of species and subspecies with biological and distributional data, tabulations of diseases or disease organisms transmitted, and complete literature citations. The groups of arthropods included, with the number of species or subspecies in parentheses, are: Part I AD-650 931: Mosquitoes (1037); Part II: Arthropods other than mosquitoes: Black flies (103), Sand flies (269), Midges (177), Horse flies (1080), Biting flies (67), Non-biting flies (50), Fleas (363), Bugs (24), Urticating and vesicating arthropods (9), Ticks (424), Mites (26), and Miscellaneous arthropods (33). (Author)
AD-650 949 HC$3.00 MF$0.65

THE FAULTLESS MOUSE HOLDER,
Army Medical Research and Nutrition Lab Denver Colo
For primary bibliographic entry see Field 6L.
AD-651 015 Not available from CFSTI.

CENTRIFUGATION OF THE WHITE-FRONTED CAPUCHIN MONKEY, CEBUS ALBIFRONS (HUMBOLDT),
Naval Aerospace Medical Inst Pensacola Fla
For primary bibliographic entry see Field 6S.
AD-651 067 HC$3.00 MF$0.65

ESTUARIES,
Michigan State Univ Hickory Corners W K Kellogg Biological Station
For primary bibliographic entry see Field 8H.
AD-651 162 Not available from CFSTI.

EXPERIMENTAL MASS INFECTION OF LICE ADAPTED TO FEEDING ON RABBITS WITH RICKETTSIA PROWAZEKI,
Army Biological Labs Frederick Md
L. A. Kosobutskii. Jun 66, 7p Rept no. Trans-1813
TT-67-61707
Trans. of Sborn. Nauch. Trudov Beloruss. Inst. Epidem. Mikrobiol. i Gig., Minsk (sic) n4 p168-72 1961.

Descriptors: (*Lice, *Rickettsia prowazeki), Infections, Mortality rates, Diseases, Rabbits, USSR.

Following infection on rabbit-hosts, 85% of the lice died in the course of the first week following the appearance of rickettsia in the smears; 52.3% of the insects contained rickettsia, consequently the effectiveness of infection comprised an average of 44.5%. A negative moment during the infection were the side effects and the death of the rabbits, which could be eliminated by the administration of the infecting doses in portions over a period of two days. (Author)
AD-651 173 HC$3.00 MF$0.65

ADAPTATION OF NEWCASTLE VIRUS TO MAMMALS,
Army Biological Labs Frederick Md
V. N. Syurin. Aug 66, 18p Rept no. Trans-1925
TT-67-61708
Trans. of Gosudarstvennyi Nauchno-Kontrolnyi Institut Veterinarnykh Preparatov. Trudy (USSR) v7 p91-105 1957.

Descriptors: (*Newcastle disease virus, Mammals), Infections, Central nervous system, Brain, Nervous system diseases, USSR.

Strain 'T' of the Newcastle virus was adapted to guinea pigs and other mammals. Following the intracerebral inoculation, the adapted virus caused an infection, clinically expressed by signs of central nervous system disease (irritability, anorexia, locomotor disruption, paralysis). In dead guinea

pigs the virus was detected in the cerebrum and cerebellum. In guinea pigs which were infected intramuscularly the presence of the virus in the blood (viremia) was proven by the biological method between 24–72 hours after inoculation. (Author)
AD-651 174 HC$3.00 MF$0.65

METHODS FOR COLLECTING FLEAS FROM THE BURROWS OF GERBILS IN PLAGUE SURVEYS IN THE SANDS OF THE NORTHERN CASPIAN SHORES,
Army Biological Labs Frederick Md
L. T. Bykov, and N. B. Belkina. Jul 66, 4p Rept no. Trans-1932
TT-67-61711
Trans. of Meditsinskaya Parazitologiya i Parazitarnye Bolezni (USSR) n5 621p 1964.

Descriptors: (*Siphonaptera, Collecting methods), Rodents, Effectiveness, Periodic variations, Textiles, USSR.

The work was carried out with the aim of seeking effective methods of collecting fleas from the burrows of midday gerbils and Tamarisk gerbils during epizootological investigations of sandy sectors of the natural plague focus in the Volga-Ural interfluvial area. A check under practical conditions fully supported the feasibility of using flannel plait for the mass collection of fleas from gerbil burrows and the advantages of this method. The plait was inserted up to 70 cm into the burrow and left there for 5 seconds, during which time it was moved around a little. Then it was removed in order to collect the fleas from it and again put back into the burrow. It was established that one worker in one working day, even if there was a small number of gerbils, could investigate more than 150 burrows with the plait by this method. (Author)
AD-651 177 HC$3.00 MF$0.65

THE VITALITY OF FLUORESCENCE MICROSCOPIC INVESTIGATIONS CARRIED OUT WITH THE HELP OF THE FLUOROCHROMES OF ACRIDINE ORANGE AND 3,4 BENZPYRENE,
Army Biological Center Frederick Md
For primary bibliographic entry see Field 6A.
AD-651 178 HC$3.00 MF$0.65

PACIFIC NORTHWEST LABORATORY ANNUAL REPORT FOR 1965 IN THE BIOLOGICAL SCIENCES,
Battelle-Northwest, Richland, Wash.
Pacific Northwest Lab.
For primary bibliographic entry see Field 6R.
For abstract, see NSA 21 09.
BNWL-280 HC$3.00 MF$0.65

AUTOMATED BIOLOGICAL LABORATORY SOIL SAMPLING STUDY FINAL REPORT, 17 FEB. 1966 - 17 FEB. 1967.
Aeronutronic, Newport Beach, Calif. Space and Re-entry Systems Div.
For primary bibliographic entry see Field 22A.
For abstract, see STAR 05 11.
N67-22222 HC$3.00 MF$0.65

PACIFIC SALMON LITERATURE COMPILATION--1900-1959. INSTRUCTIONS AND INDEX,
Bureau of Commercial Fisheries, Seattle, Wash. Biological Lab.
Galen H. Maxfield. Apr 67, 21p
See also PB-174 102.

Descriptors: (*Fishes, Reports), Bibliographies, Subject indexing, Microfiche, Scientific research, Indexes, Pacific Ocean.
Identifiers: Salmon.

Expanding research on the Pacific salmon with resultant increase in publications has created literature problems for the fishery scientist. The purpose of the compilation, totaling 645 microfiches, is to make published scientific information on the five North American species of Pacific salmon immediately accessible and usable. The compilation contains 1,406 articles on original research comprising 17,895 pages of text from 119 serials, journals, and reports. The text material was analyzed and items of information were coded according to an outline of subject categories. The pages of text are duplicated as many times as different items of information under these subject categories are contained in the text. With these duplications the material totals some 40,000 pages under 4,000 subject categories. Each item is arranged by author and date of publication. Instructions for finding information on a subject are given in the introductory text.
PB-174 101 HC$3.00 MF$0.65

PACIFIC SALMON LITERATURE COMPILATION--1900-1959. MICROFICHE SET,
Bureau of Commercial Fisheries, Seattle, Wash. Biological Lab.
Galen H. Maxfield. Apr 67, 17895p
Price includes Instructions and Index, PB-174 101.

Descriptors: (*Fishes, Reports), Bibliographies, Subject indexing, Microfiche, Scientific research, Indexes, Pacific Ocean.
Identifiers: Salmon.

Expanding research on the Pacific salmon with resultant increase in publications s created literature problems for the fishery scientist. The purpose of the compilation, totaling 645 microfiches, is to make published scientific information on the five North American species of Pacific salmon immediately accessible and usable. The compilation contains 1,406 articles on original research comprising 17,895 pages of text from 119 serials, journals, and reports. The text material was analyzed and items of information were coded according to an outline of subject categories. The pages of text are duplicated as many times as different items of information under these subject categories are contained in the text. With these duplications the material totals some 40,000 pages under 4,000 subject categories. Each item is arranged by author and date of publication. Instructions for finding information on a subject are given in the introductory text.
PB-174 102 MF$0.65

DEER BROWSING IN NORTHERN HARDWOODS AFTER CLEARCUTTING. EFFECT ON HEIGHT, DENSITY, AND STOCKING OF REGENERATION OF COMMERCIAL SPECIES.
Northeastern Forest Experiment Station, Upper Darby, Pa.
For primary bibliographic entry see Field 2F.
PB-174 587 HC$3.00 MF$0.65

STUMP SPROUTING OF FOUR NORTHERN HARDWOODS.
Northeastern Forest Experiment Station, Upper Darby, Pa.
For primary bibliographic entry see Field 2F.
PB-174 590 HC$3.00 MF$0.65

GERMINATION AND GROWTH OF PAPER BIRCH AND YELLOW BIRCH IN SIMULATED STRIP CUTTINGS.
Northeastern Forest Experiment Station, Upper Darby, Pa.
For primary bibliographic entry see Field 2F.
PB-174 591 HC$3.00 MF$0.65

TREE PLANTING IN SCRUB OAK AREAS AFTER SITE PREPARATION WITH HEAVY EQUIPMENT.
Northeastern Forest Experiment Station, Upper Darby, Pa.
For primary bibliographic entry see Field 2F.
PB-174 593 HC$3.00 MF$0.65

6D. BIONICS

NEUROMIME NETWORK SIMULATOR. APPENDIX II. NEUROMIME SIMULATOR OUTPUT.
Final rept., 19 Mar 63-15 Apr 66,
Service Bureau Corp New York
James Flaugher. Sep 66, 378p
AMRL-TR-66-101-Vol-2
Contract AF 33 (657)-11194
See also AD-650 576, Volume I. Report on Biological Information Handling Systems and Their Functional Analogs.

Descriptors: (*Bionics, Nervous system), Digital computers, Simulation, Nerve cells, Programming languages, Computer programs.

Because of the large number of network combinations and parameter variations possible in a Steele neuromime network, a program for simulating the nets on a digital computer is being developed to aid in determining the most efficient nets for specific tasks. The results of the investigation of network and parameter variations may then be used as the restraints and design criteria for neuromime devices with specific signal recognition capabilities. The simulation provides as a tool, a means of generating randomly connected networks with desired statistical restraints and a training phase which alters the network in such a manner as to force the actual response closer to the desired response. The generalized nature of the nets used is the essence of the research effort. Appendix II contains the neuromime simulator output. (Author)
AD-650 567 HC$3.00 MF$0.65

NEUROMIME NETWORK SIMULATOR.
Final rept., 19 Mar 63-15 Apr 66,
Service Bureau Corp New York
James Flaugher. Sep 66, 137p
AMRL-TR-66-101-Vol-1
Contract AF 33 (657)-11194
Report on project Biological Information Handling Systems and Their Functional Analogs. See also AD-650 567, Volume II.

Descriptors: (*Bionics, Nervous system), Digital computers, Simulation, Nerve cells, Programming languages, Computer programs.

Because of the large number of network combinations and parameter variations possible in a Steele neuromime network, a program for simulating the nets on a digital computer is being developed to aid in determining the most efficient nets for specific tasks. The results of the investigation of network and parameter variations may then be used as the restraints and design criteria for neuromime devices with specific signal recognition capabilities. The simulation provides as a tool, a means of generating randomly connected networks with desired statistical restraints and a training phase which alters the network in such a manner as to force the actual response closer to the desired response. The generalized nature of the nets used is the essence of the research effort. (Author)
AD-650 576 HC$3.00 MF$0.65

GRAPHICAL-DATA-PROCESSING RESEARCH STUDY AND EXPERIMENTAL INVESTIGATION.
Stanford Research Inst Menlo Park Calif 0511
For primary bibliographic entry see Field 9B.
AD-650 926 HC$3.00 MF$0.65

SOVIET CYBERNETICS: RECENT NEWS ITEMS, NO. 3,

Rand Corp Santa Monica Calif
For primary bibliographic entry see Field 9B.
AD-650 944 HC$3.00 MF$0.65

PATTERN RECOGNITION BY USING AN ASSOCIATIVE MEMORY.
Technical rept.,
Northwestern Univ Evanston Ill Information-Processing and Control Systems Lab
S. S. Yau, and C. C. Yang. 3 Aug 66, 5p Rept no. TR-67-108
Contract N00014-66-C-0020-A03, Grant AF-AFOSR-98-65
Availability: Published in IEEE Transactions on Electronic Computers vEC-15 n6 p944-7 Dec 1966.

Descriptors: (*Pattern recognition, Computer storage devices), Character recognition.

The purpose of the paper is to present a simple template-matching pattern recognition technique by using any general-purpose associative memory. The input patterns for recognition may have wide variations, provided that the distinct features of individual pattern classes can be extracted. Each pattern class is allowed to have deviations in size, style, orientation, etc. within certain limits. This pattern recognition technique is extremely efficient in handwritten character recognition, which is used for illustration in this paper. Because each input pattern is processed with all the pattern classes simultaneously, the speed of this pattern recognition technique is very high. It is found that most input patterns are recognized within first comparison process and no input patterns require more than two comparison processes for their recognition. (Author)
AD-650 967 Not available from CFSTI.

NEURISTOR REALIZATION STUDIES,
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
A. J. Cote, Jr. 13 May 63, 106p Rept no. CF-3026
Contract NOw-62-0604

Descriptors: (*Bionics, Nerve cells), Neuristors, Models (Simulations), Computer programs, Nerve impulses, Nerve fibers, Electrophysiology, Propagation, Mathematical models.

The status of neuristor device realization studies is summarized. The reasons for proposing the tunnel-junction structure are reviewed and the experimental and analytical studies are described. At present, the validity of the tunnel-junction approach has not yet been established. (Author)
AD-650 983 HC$3.00 MF$0.65

SOME MECHANISMS FOR A THEORY OF THE RETICULAR FORMATION.
Michigan State Univ East Lansing Div of Engineering Research
For primary bibliographic entry see Field 6P.
AD-651 207 HC$3.00 MF$0.65

6E. CLINICAL MEDICINE

DENTAL MATERIALS.
Terminal technical rept., 15 Nov 47-31 Oct 65,
Michigan Univ Ann Arbor School of Dentistry
F. A. Peyton. Mar 67, 11p Rept no. 06786-1-F
Contracts N6onr-232 (08), Nonr-1224 (50)

Descriptors: (*Dentistry, Materials), Casting, Physical properties, Mechanical properties, Cobalt alloys, Gold alloys, Plastics, Reports.

The study deals with the determination of characteristic physical and mechanical properties of restorative dental materials, and effect of manipulative variables on these properties. From the study an entirely new dental gold inlay casting technic was developed, based on the principle of controlled water added hygroscopic technic. The method has had successful dental applications and is a recognized method of dental inlay casting procedure. Evaluations were made also, of the microstructure and casting procedures for cobalt base alloys used for partial denture restorations. Investigation was made of the casting of gold alloys to embedded metals, as well as an evaluation of the properties of dental gold alloy wires. Additional studies were made on denture base resins, impression materials, and dental amalgam alloys. These studies have contributed to an improved understanding of the technics of manipulation necessary to develop the maximum quality in the finished restorations. Reports appearing in twenty-four technical publications in the periodical dental literature are listed. (Author)
AD-650 583 HC$3.00 MF$0.65

SURVEY OF RAT AND BAT BRAINS FOR THE PRESENCE OF RABIES ANTIGEN USING FLUORESCENT ANTIBODY TECHNIQUES.
Epidemiological Flight (5th) San Francisco Calif 96528
For primary bibliographic entry see Field 6M.
AD-650 682 HC$3.00 MF$0.65

METHYL ALCOHOL POISONING,
Maryland Univ Baltimore Clinical Shock Unit
James E. Crook, and Joseph S. McLaughlin. 1966, 4p
Contract DA-49-193-MD-2229
Availability: Published in Journal of Occupational Medicine v12 n9 p467-70 Sep 1966.

Descriptors: (*Methanols, Poisoning), Toxicity, Acidosis, Ingestion (Physiology), Shock (Pathology), Blood chemistry, Hyperglycemia, Potassium, Biopsy.

The serial clinical and biochemical data and the autopsy findings obtained from a patient suffering from methanol intoxication are presented. Severe metabolic acidosis, which was corrected by massive doses of buffers, was present. Alterations in serum and urinary potassium and glucose were observed. Previously observed phenomena are documented. (Author)
AD-650 784 Not available from CFSTI.

EFFECT OF HYPERBARIC OXYGENATION IN VITRO ON MAMMALIAN RESPIRATORY CHAIN-LINKED DEHYDROGENASES,
Maryland Univ Baltimore Dept of Surgery
For primary bibliographic entry see Field 6A.
AD-650 785 Not available from CFSTI.

EFFECT OF NOBLE-COLLIP DRUM SHOCK ON RESPIRATORY CONTROL IN RAT LIVER AND KIDNEY MITOCHONDRIA,
Maryland Univ Baltimore Clinical Shock Unit
For primary bibliographic entry see Field 6A.
AD-650 788 Not available from CFSTI.

RESISTANCE OF LONG-LIVED LYMPHOCYTES AND PLASMA CELLS IN RAT LYMPH NODES TO TREATMENT WITH PREDNISONE, CYCLOPHOSPHAMIDE, 6 MERCAPTOPURINE, AND ACTINOMYCIN D,
Naval Radiological Defense Lab San Francisco Calif
For primary bibliographic entry see Field 6O.
AD-650 863 HC$3.00 MF$0.65

1966 RESEARCH CLERKSHIP REPORTS.
Final rept.,
Naval Medical Research Unit No 4 Great Lakes Ill
John C. Blasko, Philip G. Boysen, Hurlis V. Graham, Jr., Don F. Holt, and Joseph A. Kaufman. Mar 67, 54p Rept no. RU-67.4
NAVMED-MF022.03.07-4002, NAVMED-MR005.09-0024

Descriptors: (*Medical research, Reports), Naval research, Antigen-antibody reactions, Mice, Immunity, Mortality rates, Penicillins, Mycoplasma, Sulfadiazine, Neisseria meningitidis, Respiratory diseases, Stress (Physiology), Resistance (Biological), Blood serum, Serodiagnosis.
Identifiers: Interferons.

Contents: The Effects of Grouping on Antibody Production and Death Rates among Mice; The Effect of Penicillin on the Oral Mycoplasma Flora of Naval Recruits; Studies on the Mechanisms of Sulfadiazine Resistance among Meningococci; Relation of Serum Factors to Stress and to Susceptibility to Acute Respiratory Diseases; The Effects of Routine Immunization on the Interferon Levels in the Blood Fractions of Navy Recruits.
AD-650 884 HC$3.00 MF$0.65

RESULTS OF SMALLPOX REVACCINATION IN ADULTS IN 1957, 1960 AND 1962,
Army Biological Labs Frederick Md
M. F. Smaga. Aug 64, 9p Rept no. Trans-1186
TT-67-61622
Trans. of Zhurnal Mikrobiologii, Epidemiologii i Immunobiologii (USSR), v41 n2 p48-52 1964.

Descriptors: (*Variola virus, Vaccines), Antigens + antibodies, Immunity, Epidemiology, Adults, Viability, Responses, Antigen-ant ody reactions, USSR.

Positive results from revaccinating adult persons using smallpox detritus in 1957, 1960, and 1962 were obtained from, respectively, 78, 46, and 84% of those inoculated. The influenza epidemic evidently cannot be the reason for the high inoculability upon the last revaccination, since in the same epidemiological situation inoculability was half as high before the preceding revaccination. The high inoculability upon revaccination in 1962 can be explained by the higher virulence of the vaccine. The inoculability of the vaccine depended also on the results of the preceding revaccination: the smallest number of positive skin reactions (8%) on repeated reimmunization was observed for inoculated persons who had evidenced strongly positive postvaccinal reaction the last time. (Author)
AD-650 888 HC$3.00 MF$0.65

CURRENT STATE OF SMALLPOX PROPHYLAXIS,
Army Biological Labs Frederick Md
S. S. Marennikova, and V. D. Solovev. Apr 67, 11p Rept no. Trans-1680
TT-67-61624
Trans. of Zhurnal Mikrobiologii, Epidemiologii i Immunobiologii (USSR), v42 n9 p15-21 1965.

Descriptors: (*Variola virus, Diseases), Public health, Infections, Epidemiology, Diagnosis, Embryonated egg technique, Vaccines, Genetics, Immunity, Antigens + antibodies, Biosynthesis, USSR.

The materials presented in the article testify that in the problem of smallpox prophylaxis, in spite of the doubtless successes achieved, there remain many unresolved and unclear problems. Their rapid resolution will have great significance both for theoretical virology as well as for practical public health. (Author)
AD-650 890 HC$3.00 MF$0.65

AN EXPERIMENTAL STUDY OF SIMULTANEOUS VACCINATION AGAINST TULAREMIA AND TUBERCULOSIS,
Army Biological Labs Frederick Md
R. A. Saveleva. May 66, 10p Rept no. Trans-1668
TT-67-61628

Trans. of Zhurnal Mikrobiologii, Epidemiologii i Immunobiologii (USSR), v41 n4 p118-24 1964.

Descriptors: (*Mycobacterium tuberculosis, Vaccines), (*Pasteurella tularensis, Vaccines), Effectiveness, Immunity, Resistance (Biological), Allergy, Guinea pigs, Experimental design, USSR.

The simultaneous cutaneous vaccination (separately or associated) against tularemia and tuberculosis creates a high immunity in guinea pigs against tularemia, and a specific resistance to subcutaneous infection with 1000 lethal doses of a virulent strain. Distinct immunological indices (allergic reaction and agglutination) in respect to tularemia were also noted in these pigs. In the animals which were inoculated simultaneous with the two vaccines, the local and general reactions were practically no different from the reactions in pigs which were inoculated with monovaccines. This demonstrates the harmlessness of combined vaccination. In guinea pigs which were vaccinated against tularemia and tuberculosis the immunity against tularemia was maintained over a period of 6 months (period of observation) to the same degree as in pigs which were inoculated with tularemia vaccine alone. The data obtained demonstrates the feasibility of the simultaneous vaccination against these two infections with the complete compatibility of the vaccines and a mild reactogenicity, which makes it possible to recommend that the appropriate testing of vaccination against tularemia and tuberculosis be carried out on humans. (Author)
AD-650 894 HC$3.00 MF$0.65

SUMMARIES OF RESEARCH REPORTED ON DURING 1966.
Special rept.,
Naval Submarine Medical Center Groton Conn Medical Research Lab
Jessie W. Kohl. 15 Feb 67, 42p Rept no. SR-67-4

Descriptors: (*Medical research, Reports), Decompression sickness, Color vision, Pressure breathing, Blood coagulation, Submarine personnel, Night vision, Oxygen, Human engineering, Fire control systems, Auditory acuity, Vision, Speech, Intelligibility, Drowning, Virus diseases, Diagnosis, Antigens + antibodies, Medical personnel, Military medicine, Underwater, Diving, Adaptation (Physiology), Bandwidth, Noise, Visual acuity, Eye, Teeth, Diseases, Pitch discrimination, Thresholds (Physiology), Attention, Voice communication systems, Spacecraft, Rhythm (Biology), Respiration, Sonar signals, Audiometry, Lasers, Radiation effects, Confined environments, Telemeter systems, Blattidae, Pest control, Dentistry, Naval training, Recruiting, Hygiene, Vertigo, Abstracts, Symposia.

The publication presents a summary of each of the research reports published during the calendar year 1966 by the Submarine Medical Research Laboratory at the Submarine Medical Center, in that Laboratory's regular chronological series. A listing is presented of the title of the reports issued in the Memorandum and Special Report series. Also included is a list of articles which were 'in press' with scientific journals at the end of the year; and a list of articles presented before scientific societies during the year, also publications (other than SMRL Reports) by staff members during the same period, and a notation of honors, elections, citations to staff members, as well as a listing of Seminars and Symposia conducted at SMRL and those held elsewhere in which staff members have played an important role. (Author)
AD-650 911 HC$3.00 MF$0.65

FETAL RESPONSE TO IMMUNIZATION.
Annual progress rept., 1 Apr 66-31 Mar 67,
Johns Hopkins Univ Baltimore Md School of Medicine
Arthur M. Silverstein, Charles J. Parshall, Jr., and Robert A. Prendergast, Apr 67, 10p
Contract DA-49-193-MD-2640

Descriptors: (*Embryos, Immunity), Surgical techniques, Pregnancy, Mammals, Antigen-antibody reactions, Transplantation, Thymus, Excision, Tolerances (Physiology), Infectious diseases, Viruses, Treponema pallidum.

Techniques are being developed and refined to permit a variety of surgical procedures to be performed on the fetal lamb in utero without interruption of pregnancy. These approaches have been employed to study various aspects of the development of immunologic responses by the mammalian fetus. The fetus is able to respond actively to antigenic stimulus quite early in gestation, but throughout the course of gestation develops competence to different antigens at different times. This sequential attainment of immunologic competence appears not to be a function of the gross physical or chemical characteristics of the antigen. Once the fetus develops competence to a given antigen, it demonstrates no immaturity of response either qualitative or quantitative, but rather forms antibody and rejects skin homografts in an adult manner. Thymectomy of the fetal lamb at the end of the first third of gestation does not interfere with its ability to form circulating antibodies or to reject skin homografts in the normal manner, nor with its subsequent development of immunologic competence to other antigens. It has not been possible to demonstrate the development of any mutual tolerance for homograft antigens between mother and fetus during gestation. Studies were initiated to assess the possible contribution of immunologic mechanisms to the pathogenesis of congenital infectious disease processes, by infecting fetal lambs with the neurotropic bluetongue virus, and fetal Rhesus monkeys with Treponema pallidum. (Author)
AD-650 922 HC$3.00 MF$0.65

EFFECT OF SEWAGE TREATMENT ON RECOVERY OF POLIOVIRUS FOLLOWING MASS ORAL IMMUNIZATION.
Naval Medical Research Unit No 4 Great Lakes Ill
E. P. Theios, J. G. Morris, M. J. Rosenbaum, and A. G. Baker. Feb 67, 9p Rept no. RU-67.7
NAVMED-MF-022.03.07-4016
Presented at the Annual Meeting of the American Public Health Association (93rd), Chicago, Ill., 21 Oct 65.
Availability: Published in American Journal of Public Health v57 n2 p295-300 Feb 1967.

Descriptors: (*Sewage, *Poliomyelitis virus), Recovery, Excretion, Vaccines, Immunity, Public health, Chlorination.

Activated sludge sewage treatment process was found to be far superior to trickling filtration for removal of trivalent oral polioviruses. Excretion of such viruses was observed to continue for at least 56 days after vaccination. Considerable variation in recovery of virus Types I and II was observed in the two different populations. Chlorination did not eliminate virus recovery. (Author)
AD-650 937 Not available from CFSTI.

DESCRIPTION OF CURRENT TISSUE BANK METHODS OF SKIN PRESERVATION.
Naval Medical Research Inst Bethesda Md Tissue Bank Div
Vernon P. Perry. Dec 66, 17p
NAVMED-MR-005.02.0002-1
Presented at the Annual Meeting, Society for Cryobiology (2nd), Madison, Wis., 2 Aug 65.
Availability: Published in Cryobiology v3 n2 p178-91 1966.

Descriptors: (*Tissues (Biology), Preservation), Skin, Transplantation, Processing, Preparation, Storage, Freezing, Freeze drying.
Identifiers: Cryobiology.

Three methods of skin preservation are employed by the U. S. Navy Tissue Bank. Each method has its advantages and disadvantages with regard to preparation as well as application and performance. Clinical trials have tended to categorize these different preparations from a performance stand point; it now appears desirable to attempt a careful analysis of the innate properties of the preparations to see whether modifications in processing might yield a single product which would contain most of the advantages and fewer of the disadvantages of the individual preparations. The three methods of skin storage - nutrient media refrigeration, protected freezing, and freeze-drying, offer alternatives to hospitals and medical centers for the storage of skin grafts. (Author)
AD-650 939 Not available from CFSTI.

OSTEOSARCOMA OF THE JAWS.
Armed Forces Inst of Pathology Washington D C Dental and Oral Pathology Div
George E. Garrington, Henry H. Scofield, John Cornyn, and Southern P. Hooker. 5 Dec 66, 15p
Availability: Published in Cancer v20 n3 p377-91 Mar 1967.

Descriptors: (*Cancer, *Bone), Head, Mouth, Diagnosis, X rays, Histology, Therapy, Biopsy, Etiology, Pain, Pathology.

Fifty-six cases of osteosarcoma of the maxilla or mandible are analyzed for clinical, roentgenographic and histologic character, therapy and prognosis. The mean age at the onset of symptoms for osteosarcoma of the jaws is about a decade later than for osteosarcoma of other bones. Pain is less often associated with osteosarcoma in the jaws than it is in the long bones. Roentgenographic evidence of a symmetrically widened periodontal membrane space may be a significant early finding. There is no correlation between the histologic character of the tumors and prognosis but prognosis does appear to vary depending upon the specific site of origin within the bones. The worst prognosis is associated with maxillary antral osteosarcomas and mandibular symphysis osteosarcomas have the best prognosis. Radical surgery is the treatment of choice. Approximately one third of the patients had biopsy-proved metastasis, with the lung being the most common site. (Author)
AD-650 954 Not available from CFSTI.

DRUG REACTIONS IN THE FIELD OF PATHOLOGY.
Armed Forces Inst of Pathology Washington DC
Nelson S. Irey. 1967, 1p
Availability: Published in The Bulletin of Pathology v8 n2 p49 Feb 1967.

Descriptors: (*Drugs, Pathology), Responses, Tissues (Biology), Histology, Etiology, Diagnosis, Visual inspection.

In resolving problems of drug reaction, emphasis is on identifying the causative agent; to this end the microscopic findings must be supplemented by other data. An etiologic differential diagnosis must be broad based--if diagnostic error is to be avoided. (Author)
AD-650 956 Not available from CFSTI.

ETHICS OR ECONOMICS. A VIEW OF PROFESSIONAL ETHICS.
Interim rept.,
Delaware Univ Newark
Charles G. Wilber. May 67, 11p
Contract DA-49-193-MD-2627
Supported in part by AFOSR.
Availability: Published in The Journal of the American Osteopathic Association v66 p763-72 Mar 1967.

Descriptors: (*Medical personnel, Behavior), Philosophy, Attitudes, Theory, Reproduction (Physiology).

The basis of ethical theory is explored and the results applied to selected problems in the healing arts. It is concluded that a physician need use ordinary means to preserve life but is not forced ethically to use extraordinary means. Sterilization is a problem which involves giving too much power over persons to government. Abortion is difficult to justify but in some cases the principle of the double effect applies. The urgency for a careful re-evaluation of professional ethics by the profession itself is emphasized. (Author)
AD-650 972 Not available from CFSTI.

A REVIEW OF SKIN PRESERVATION,
Naval Medical Research Inst Bethesda Md Tissue Bank Div
Vernon P. Perry. 1965, 24p
NAVMED-MR005.02.0002-2
Prepared for presentation at the Annual Meeting of the Society for Cryobiology (2nd), August 2-4 1965, Madison, Wisc.
Availability: Published in Cryobiology v3 n2 p109-30 1966.

Descriptors: (*Skin, Preservation), Transplantation, Freezing, Freeze drying, Viability, Tissues (Biology), Storage, Processing, Costs, Reviews.
Identifiers: Cryobiology.

The history of skin preservation for clinical application is confined to a relatively short period (the last 65 years) during which time three methods or techniques have been developed. The use of refrigeration temperatures (above 0C.) offered to the physician for the first time a means of graft storage for periods of relatively short duration. The limitation of storage time soon became apparent and methods were sought which could extend the usefulness of the stored skin graft. Techniques for freezing were developed, and frozen skin banks of limited size were established at many large medical facilities. At best, however, these banks satisfied only the immediate needs of the local facility. Freeze-drying was introduced as a method permitting large scale, long term storage of grafts. While the basic equipment costs were high, skin grafts, once processed, could be stored at room temperature and shipped long distances using conventional mail facilities. (Author)
AD-651 031 Not available from CFSTI.

ZINC LEVELS AND BLOOD ENZYME ACTIVITIES IN EGYPTIAN MALE SUBJECTS WITH RETARDED GROWTH AND SEXUAL DEVELOPMENT,
Naval Medical Research Inst Bethesda Md 2106
Y. D. Coble, R. VanReen, A. R. Schulert, R. P. Koshakji, and Z. Farid. 1966, 8p
NAVMED-MR005.06.0003-9
Prepared in cooperation with Naval Medical Research Unit No. 3 Cairo (Egypt) and Vanderbilt Univ., Nashville, Tenn. Div. of Nutrition; grant NIH-AMO-8317-02. Monitored under ARPA Order-580.
Availability: Published in American Journal of Clinical Nutrition v19 p415-21 1966.

Descriptors: (*Deficiency diseases, *Zinc), Males, Blood chemistry, Enzymes, Growth, Sex glands, Egypt.
Identifiers: Dwarfism.

Zinc deficiency in animals results in a retardation of growth and sexual development. An attempt has been made during previous investigations to correlate low plasma zinc levels in rural male Egyptians with retarded growth and sexual development. Our present studies have revealed that plasma zinc levels in rural male Egyptians with normal maturation are also low. Normal Egyptians and Americans living in Cairo have normal plasma zinc levels. Egyptian 'hypogonadal dwarfs' have been demonstrated to ultimately obtain sexual maturity and a normal stature without treatment or change in their low plasma zinc levels. Thus the significance of plasma zinc level as a reflection of maturation or zinc deficiency remains unclear. (Author)
AD-651 054 Not available from CFSTI.

IMMUNIZATION OF MAN WITH THE LIVE M-44 Q-FEVER VACCINE,
Army Biological Labs Frederick Md
A. N. Sterkhova. Jun 66, 6p Rept no. Trans-1807
TT-67-61698
Trans. of Zhurnal Mikrobiologii, Epidemiologii i Immunobiologii (USSR) v42 n12 p48-52 1965.

Descriptors: (*Vaccines, Effectiveness), (*Coxiella, Vaccines), (*Immunity, Coxiella), Humans, Dosage, Serodiagnosis, Antigen-antibody reactions, Allergy, USSR.

In a test on humans (495 men) the weak reactogenicity of the live M-44 vaccine in a dose of 0.0001 and its immunological effectiveness were established. A positive result in the complement fixation reaction was obtained in 82.3 plus or minus 4%, the average titer was 1:26.6. The vaccination of persons whose sera contained specific complement fixing antibodies prior to inoculation did not cause allergic reactions in them. Consequently the live M-44 vaccine against Q-fever may be used for inoculation without a preliminary serological investigation. (Author)
AD-651 136 HC$3.00 MF$0.65

SMALLPOX IMMUNITY IN SAILORS,
Army Biological Labs Frederick Md
A. F. Yatsenko, L. I. Korobov, and L. M. Shafran. Apr 66, 7p Rept no. Trans-1687
TT-67-61705
Trans. of Zhurnal Mikrobiologii, Epidemiologii i Immunobiologii (USSR) v42 n9 p21-4 1965.

Descriptors: (*Variola virus, Vaccines), (*Naval personnel, Immunity), Armed forces (Foreign), Effectiveness, Sensitivity, Antigen-antibody reactions, USSR.

When revaccinating Soviet sailors against smallpox, a positive inoculation reaction was noted in 26% of those inoculated; among revaccinated foreign sailors positive reactions comprised 60–75%. In considering that the number of foreign sailors who reacted positively to small pox vaccination was almost 3 times greater than that of Soviet sailors, the sanitary-quarantine service is advised to be alert with respect to the crews and passengers of foreign vessels, since they may serve as the source of the importation of smallpox into the USSR. (Author)
AD-651 171 HC$3.00 MF$0.65

CONCERNING THE PROBLEM OF INFECTIOUS DISEASE ERADICATION,
Army Biological Labs Frederick Md
L. V. Gromashevskii. Jun 66, 11p Rept no. Trans-1806
TT-67-61706
Trans. of Zhurnal Mikrobiologii, Epidemiologii i Immunobiologii (USSR) v42 n12 p3-10 1965.

Descriptors: (*Infectious diseases, Control), Public health, Epidemiology, Parasitic diseases, Organizations, USSR.

The eradication of an infectious disease is the final step in the successful struggle with that disease. Scientific and practical operations for isolating those diseases which on the level of the modern achievements of science and organizational possibilities can be designated as accessible for eradication are discussed. Such operations should be carried out with sufficient competence and discretion and obtain the support and approval of the qualified scientific community. In all other cases, when the true eradication of an infectious disease under modern conditions is unrealistic, it is possible to set up any other attainable goal which can be accurately formulated, for example, 'barring of lethal outcomes,' or 'reduction of incidence' to a specific incidence or by a specific number of times.
AD-651 172 HC$3.00 MF$0.65

ANTIHEMAGGLUTINATING ANTIBODY SPECTRUM FOLLOWING EXPERIMENTAL IMMUNIZATION WITH TICK-BORNE ENCEPHALITIS VIRUSES,
Army Biological Labs Frederick Md
For primary bibliographic entry see Field 6M.
AD-651 176 HC$3.00 MF$0.65

EPIDEMIOLOGICAL CHARACTERISTICS OF A FOCUS OF TICK-BORNE ENCEPHALITIS IN PRESAYAN (IRKUTSK OBLAST),
Army Biological Labs Frederick Md
M. V. Arkhangelskaya, and A. S. Gelfand. Apr 66, 10p Rept no. Trans-1686
TT-67-61714
Trans. of Zhurnal Mikrobiologii, Epidemiologii i Immunobiologii (USSR) v42 n9 p96-100 1965.

Descriptors: (*Arboviruses, *Epidemiology), Ticks, Disease vectors, Ecology, Diseases, Public health, Population, Vaccines, Serodiagnosis, USSR.

The following peculiarities were exposed in the contact of the population with the natural focus of tick-borne encephalitis in the territory of the forest belt of Presayan: For the population of settlements belonging to lumbering enterprises, the daily living factor lay at the basis of this contact; for the population of settlements belonging to the chemical-lumbering trusts the industrial factor played a significant role; however, its significance was spread to all the groups of the population, which specified the approximately similar conditions of contact with the focus for the entire population. It is expedient to differentiate the system of prophylactic measures in respect to the inhabitants of populated points of different types: For the settlements belonging to the chemical-lumbering trusts they should include the compulsory general vaccination of the population and the creation of tick-free zones around the populated points; for residents of the settlements belonging to lumbering establishments, along with the mass immunization of the population, it is necessary to carry out tick exterminating measures at the sites which are most frequently visited by the inhabitants in the performance of their everyday tasks. A correlation was revealed between immunological indices (based on the complement fixation reaction) and the zoo-parasitological indices of the intensity of the natural focus (numerical strength and virus carrying ability of the ticks in nature) in various years. (Author)
AD-651 180 HC$3.00 MF$0.65

PROSTHESIS FOR A FOREQUARTER AMPUTEE-LABORATORY EVALUATION.
Technical rept.,
Walter Reed Army Medical Center Washington D C Army Medical Biomechanical Research Lab
John W. Hodge. Apr 67, 16p Rept no. TR-6703

Descriptors: (*Prosthetics, Arms), Amputees, Performance (Engineering), Force (Mechanics), Torque, Batteries + components, Life expectancy.

An upper extremity prosthesis for a forequarter amputee was laboratory evaluated. The evaluation consisted of an observation of the functional characteristics with emphasis on cable force and excursion levels, battery life, and cyclic tests. The results obtained indicate an acceptable level of performance. It was concluded that this type of prosthesis should satisfy the needs of the forequarter amputee to a great extent. (Author)
AD-651 208 HC$3.00 MF$0.65

SYNTHESIS OF ALKYL 2-CYANOPROPIONATES AND MEASUREMENT OF THEIR SPREADING COEFFICIENTS ON 1% AQUEOUS CASEIN AND ON WATER.
Walter Reed Army Medical Center Washington D C Army Medical Biomechanical Research Lab
For primary bibliographic entry see Field 11A.
AD-651 209 HC$3.00 MF$0.65

POROUS PLASTIC BODY JACKET AND POROUS CERVICAL COLLAR.
Technical rept.,
Walter Reed Army Medical Center Washington D C Army Medical Biomechanical Research Lab
James T. Hill, and Henry Mouhot. Jan 67, 17p
Rept no. TR-6702

Descriptors: (*Prosthetics, Thorax), (*Laminated plastics, Prosthetics), Porous materials, Body, Castings, Impregnation.

A technique is described for preparing porous reinforced body jackets and cervical collars utilizing preimpregnation techniques. (Author)
AD-651 212 HC$3.00 MF$0.65

ANNUAL REPORT (NO. 12) OF THE USAF MEDICAL SERVICE, 1 JULY 1964-30 JUNE 1965.
Office of the Surgeon General (Air Force) Washington D C
1966, 179p

Descriptors: (*Medical research, Reports), (*Military medicine, Air Force research), Medical personnel, Hospitals, Aviation medicine, Dentistry, Veterinary medicine, Vietnam, Biometry, Mortality rates, Physical fitness, Air Force personnel, Pathology, Diagnosis.

Contents: Organization; Staffing and Education; Hospitalization; Professional Services; Dental Services; Veterinary Services; Medical Support of U. S. Military Operations in Vietnam; Tables; Charts; Biostatistics: Workload; Medical Care; Morbidity; Manpower Losses.
AD-651 213 HC$3.00 MF$0.65

INVESTIGATIONS LEADING TO IMPROVED DENTAL RESTORATIVE MATERIALS.
Rept. for 22 Feb 66-21 Feb 67,
Alpha Research and Development, Inc., Blue Hill, Ill.
Robert L. Patrick, Charlotte M. Kaplan, E. R. Beaver, and Robert J. Nelsen. 21 Feb 67, 69p
Contract PH-43-64-502

Descriptors: (*Dentistry, Plastics), Polymers, Films, Acrylic resins, Acrylonitrile polymers, Interfaces, Teeth, Prosthetics, Permeability.

Permeability studies were performed on rubbery polymer liner films. Diffusion through the polymer film was definitely slower than the diffusion through the acetate film, even when the acetate film was double the thickness of the polymer film. In an attempt to study the loci of diffusion in model restorations, the uses of a fluorescent dye and an ultra-violet light, showed micro-leakage in many of the diffusion cells. In those exhibiting no leakage, a slow diffusion rate was observed, which was of equal velocity for all types of restorations. Thermocycling grossly affects the adhesion at the tooth/ epoxide interface in samples with uncoated preparations as well as those that were polymer lined. The presence of silane in the preparation with and without liner, protected the restorations from leakage after thermocycling. The load to failure of the restorations was once again enhanced by the addition of liner to the preparation. This enhancement was even more significant when Silane A-1100 was used with the polymer liner. The silane also markedly protected the adhesive bond from the effects of prolonged moisture exposure. The effects of thermocycling of tooth specimens were also evaluated in relation to cure time and effect of repetitive thermocycling in the various preparations. (Author)
PB-174 453 HC$3.00 MF$0.65

6G. ESCAPE, RESCUE, AND SURVIVAL

FEASIBILITY TEST OF SEARCH AND RESCUE RADIO BEACON.
National Aviation Facilities Experimental Center Atlantic City N J
For primary bibliographic entry see Field 17G.
AD-650 898 HC$3.00 MF$0.65

DEVELOPMENT OF INFLATABLE FRAME FOR ARCTIC SURVIVAL SHELTER.
Schjeldahl (G T) Co Northfield Minn
For primary bibliographic entry see Field 13M.
AD-651 058 HC$3.00 MF$0.65

6H. FOOD

DEVELOPMENT OF A DISHWASHING RACK FOR MESS TRAYS.
Technical review rept.,
Naval Supply Research and Development Facility, Bayonne, N. J.
M. L. Mayer, and M. E. Ryberg. 4 Aug 61, 27p

Descriptors: (*Kitchen equipment + supplies, Design), Performance (Engineering), Aluminum alloys.

Masking effects caused by close positioning of mess trays in the Navy 12-tray, stainless-steel dishwashing rack have been remedied by altering the rack design to reduce the number of trays from twelve to six. In addition, a weight reduction was accomplished by fabricating the rack from aluminum alloy. A newly designed 6-tray dishwashing rack, fabricated from aluminum alloy was found to weigh only 74% as much as the present aluminum rack; its corrosion resistance under Navy dishwashing machine conditions was satisfactory; it was much easier to load; and its service life is estimated to be four times that of the present rack. (Author)
AD-278 891 HC$3.00

REQUIREMENTS FOR INSTANT PREPARED, READY-TO-EAT, FREEZE-DRIED SCRAMBLED EGG.
Technical rept.,
Swift and Co Chicago Ill
P. E. Mone, and L. D. Mink. Jan 67, 60p
FD-54, USA-NLABS-TR-67-49-FD
Contract DA-19-129-AMC-121 (N)

Descriptors: (*Military rations, Eggs), (*Eggs, Freeze drying), Acceptability, Preparation, Military requirements, Stability, Storage, Taste, Odors, Processing, Dehydrated foods, Frozen foods.

In the design of 'Quick Serve Meals' as a military operational ration, there was a need for a quickly prepared egg product in the breakfast menus. A prototype scrambled, cooked, freeze-dried whole egg product was developed which possessed the appearance, aroma, flavor and texture similar to pan-fried scrambled egg, after rehydrating in hot water for 1 to 3 minutes. Summer and winter produced USDA table grades A and B shell eggs were obtained from 6 different geographical areas of the United States to provide for a random selection of eggs from major egg producing areas. All eggs after receipt were held at 40F until processed except that the frozen table grade egg was held at -10F. The eggs were weighed, check graded, broken, homogenized, pasteurized, stabilized (desugared), precooked, frozen, freeze dried and vacuum and nitrogen treated before sealing in both cans and pouches. The packaged freeze dried eggs were stored at 38-40F and 100F for six months. They were evaluated organoleptically for quality by a trained panel initially and at the end of the storage period. Bacteriological and chemical data were obtained on the raw and processed eggs. Detailed recommendations are provided for raw material, plant equipment and processing procedure. (Author)
AD-650 637 HC$3.00 MF$0.65

THE WHOLESOMENESS OF IRRADIATED FOODS.
Army Medical Research and Nutrition Lab Denver Colo
Nicholas Raica, Jr. 1965, 3p
Availability: Published in Activities Report v17 n2 p111-3 Fall.

Descriptors: (*Irradiated foods, Acceptability), Preservation, Sterilization, Processing, Laboratory animals, Humans, Nutrition, Toxicity.

It was concluded from extensive long-term feeding and other studies that foods irradiated with ionizing radiations to 5.6 Mrads with energies of up to 10 Mev are as wholesome as foods processed by conventional methods. (Author)
AD-651 020 Not available from CFSTI

6I. HYGIENE AND SANITATION

STAUB, VOLUME 26, NO. 8.
Israel Program for Scientific Translations, Ltd. Jerusalem.
Aug 66, 47p
Transl. Into English From German Published for Nsf and Dept. of Health, Educ. and Welfare

Descriptors: *Aerosol, *Clean room, *Dust, *Hygiene, *Radioactive particle, Air, Amine, Clean, Control, Fog, Gas, Microscope, Mineral, Particle, Pollution, Radioactivity, Room, Size, Trace, Vacuum, Vapor.

For abstract, see STAR 05 11.
N67-23440 HC$3.00 MF$0.65

6K. LIFE SUPPORT

SPACE-CABIN ATMOSPHERES. PART III - PHYSIOLOGICAL FACTORS OF INERT GASES.
Lovelace Foundation for Medical Education and Research, Albuquerque, N. Mex.
E. M. Roth. 1967, 135p NASA-SP-117
Prepared for Nasa

Descriptors: *Physiological factor, *Rare gas, *Space cabin atmosphere, Atmosphere, Bibliography, Cabin, Chemistry, Decompression, Effect, Factor, Gas, Inert, Metabolism, Physical, Physiology, Property, Rare, Sickness, Space.

For abstract, see STAR 05 11.
N67-22878 HC$3.00 MF$0.65

RESEARCH, DESIGN AND DEVELOPMENTS OF AN IMPROVED WATER RECLAMATION SYSTEM FOR MANNED SPACE VEHICLES.
Rai Research Corp., Long Island City, N. Y.
S. B. Tuwiner. Apr 66, 62p NASA-CR-66323
Contract NAS1-4373

Descriptors: *Electrochemical oxidation, *Manned spacecraft, *Urine, *Water recovery, Bibliography, Chemical, Composition, Development, Electrochemical, Manned, Osmosis, Oxidation, Phase, Prototype, Recovery, Reverse, Separation, Spacecraft, System, Treatment, Water.

For abstract, see STAR 05 11.
N67-23324 HC$3.00 MF$0.65

6L. MEDICAL AND HOSPITAL EQUIPMENT

SIMPLE METHOD FOR MANIPULATION AND REPEATED SAMPLING FROM DIALYSIS BAGS.
Memo. rept.,
Naval Submarine Medical Center Groton Conn
Donald V. Tappan. 8 Nov 66, 8p Rept no. NSMC-MR-67-2
NAVMED-MR005.04-0053.02
Availability: Published in Analytical Biochemistry, v18 n2, Feb 1967.

Descriptors: (*Dialysis, Laboratory equipment), Seals, Labels, Biochemistry.

A device is described which provides for the sealing, repeated opening, sampling from, and suspension of dialysis bags. Since the tool consists essentially of a modified laboratory screw clamp, it can be fabricated from the materials at hand in almost any laboratory to assist with this important biochemical process. (Author)
AD-650 711 Not available from CFSTI.

THE FAULTLESS MOUSE HOLDER,
Army Medical Research and Nutrition Lab Denver Colo
Lloyd D. Jones. 1965, 2p
Availability: Published in Laboratory Animal Care v15 n5 p373-4 1965.

Descriptors: (*Mice, *Laboratory equipment), Laboratory animals, Safety harness.

Although holders for restraining mice during intravenous procedures carried out on the tail veins have been devised previously, the approach described here represents a novel idea that could be used in many laboratories. The mouse-holder was fashioned from a 2-ounce metal dose syringe. Slots were cut with a hack saw. All edges and corners must be rounded and polished smooth. It was completed by the addition of a No. 6 black rubber stopper with one hole. The holder is sufficiently heavy to be used alone on a work table. It may be steadied or secured by any weighted object. It serves very well in a round jawed straight burette clamp mounted on a ring stand. In this position the ordinary laboratory mouse is easily introduced backwards and threaded through by the tail. Forceps are used to hold the tails of more difficult mice. This completely eliminates any possibility of the mouse reversing direction and travelling the tail to attack sensitive fingers. Animals may thus be held captive for long periods of time without ill effect. This holder could be easily duplicated and produced from several materials as glass, fiberglass, plastic, or hard rubber. (Author)
AD-651 015 Not available from CFSTI.

ISODOSES OF THE CS RADIATION EQUIPMENT OF THE KFA JUELICH (PROBLEM OF THE DEEP RAY THERAPY).
Kernforschungsanlage, Juelich (West Germany). Zentralabteilung Strahlenschutz.
For primary bibliographic entry see Field 6R.
For abstract, see STAR 05 11.
N67-23029 HC$3.00 MF$0.65

EQUIPMENT FOR LOCAL IRRADIATION OF TRANSPLANTED MOUSE TUMORS WITH THERMAL NEUTRONS IN REACTOR FRJ-1.
Kernforschungsanlage, Juelich (West Germany). Inst. Fuer Medizin.
For primary bibliographic entry see Field 6R.
For abstract, see STAR 05 11.
N67-23033 HC$3.00 MF$0.65

6M. MICROBIOLOGY

SURVEY OF RAT AND BAT BRAINS FOR THE PRESENCE OF RABIES ANTIGEN USING FLUORESCENT ANTIBODY TECHNIQUES.
Final rept., Jan-Aug 66,
Epidemiological Flight (5th) San Francisco Calif 96528
Neil C. Westerlund. Nov 66, 12p Rept no. 5EL-TR-66-5

Descriptors: (*Rabies virus, *Fluorescent antibody techniques), Rats, Bats, Disease vectors, Antigens + antibodies, Brain, Diseases.

Numerous rates and bats were collected during a small animal survey which was conducted on and around Clark AB during the early part of 1966. Since rabies is an important problem in the Philippines the brains of these animals were examined for the presence of rabies antigen in hopes of finding a sylvan reservoir for the disease. Because of the advantages of speed and increased sensitivity which are inherent in the procedure it was decided to examine the brains using the fluorescent antibody technique. During the course of this study 133 bat brains and 123 rat brains were examined. All of the brains were found to be negative for rabies antigen. (Author)
AD-650 682 HC$3.00 MF$0.65

LARGE BODIES OF MYCOPLASMA AND L-FORM ORGANISMS,
Pennsylvania State Univ University Park Dept of Microbiology
K. S. Kang, and L. E. Casida, Jr. 10 Oct 66, 7p
Research supported in part by ONR.
Availability: Published in Journal of Bacteriology, p1137-42 Mar 1967.

Descriptors: (*Mycoplasma, Cell structure), Biological stains, Fluorescence, Microscopy, Viability, Morphology (Biology), Visual inspection.
Identifiers: L-form organisms.

The large bodies of various Mycoplasma and L-form organisms were studied by ultraviolet fluorescence microscopy of preparations stained with various fluorochromes. Primuline and Thioflavine S specifically stained the outer portion or rim of the large bodies, and the fluorescence characteristics of the stained bodies differed from those for other microorganisms and for spheroplasts and protoplasts. Small granular structures similar in size and morphology to minimal reproductive units were observed within some of the large bodies by phase microscopy and by fluorescence microscopy with acridine orange or Coriphosphine O. Micromanipulation probing of the large bodies revealed their elastic nature; many of the large bodies could be subdivided into two or more smaller circular bodies, each retaining the fluorescence staining properties of the parent body. Under these conditions, however, a few of the large bodies were ruptured, leaving the stainable outer boundary area as a stable residual structure. The large bodies were somewhat resistant to various rigorous treatments normally employed to eliminate viability of Mycoplasma and L-form cultures. Structures similar to large bodies were observed in various natural tissues, and structures resembling large bodies in size, morphology, fluorescence staining characteristics, and reaction to micromanipulation probing were reconstructed from an acetone extract of egg yolk. (Author)
AD-650 714 Not available from CFSTI.

EFFECTS OF NITROGEN SUPPLEMENTS ON NITROGEN FIXATION BY AEROBACTER AEROGENES,
South Dakota State Univ Brookings Dept of Bacteriology
R. B. Patil, R. M. Pengra, and D. C. Yoch. 18 Jul 66, 5p
Contract Nonr-3089 (00)
Availability: Published in Biochimica et Biophysics Acta v136 p1-5 1967.

Descriptors: (*Aerobacter aerogenes, Metabolism), Ammonia, Ions, Nitrogen, Amino acids, Growth, Inhibition, Aspartic acid, Pyruvates, Enzymes, Biosynthesis.
Identifiers: Nitrogen fixation.

The effects of limiting concentrations of NH4 (+) and amino acids on nitrogen fixation by Aerobacter aerogenes have been compared. The organism exhibited typical diphasic growth during the fixation of nitrogen in the presence of NH4 (+), whereas in the presence of amino acids growth was continuous and uninterrupted by a prefixation lag period. The effect of added aspartic acid on nitrogen fixation was similar to that of amino acids. However, pyruvate added together with NH4 (+) did not prevent the prefixation lag period. The duration of the adaptive lag period varied in direct proportion to the amount of NH4 (+) present when mixed supplements of NH4 (+) and amino acids were used. The intracellular ninhydrin-positive material that was present at the onset of the lag period decreased considerably by the termination of this period. It was suggested that NH4 (+) exerted an antagonistic influence on the nitrogen-fixing system ('nitrogenase'). Exhaustion of NH4 (+) from the medium caused a release of this inhibition and nitrogenase synthesis took place during the adaptive lag period at the expense of the amino acid pool which was derived through nitrogen (inducer)-stimulated protein turnover. (Author)
AD-650 721 Not available from CFSTI.

INTERRELATION OF PHYTOPLANKTON AND SAPROPHYTE BACTERIA IN A RESERVOIR,
Foreign Technology Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 8H.
AD-650 805 HC$3.00 MF$0.65

1966 RESEARCH CLERKSHIP REPORTS.
Naval Medical Research Unit No 4 Great Lakes Ill
For primary bibliographic entry see Field 6E.
AD-650 884 HC$3.00 MF$0.65

RESULTS OF SMALLPOX REVACCINATION IN ADULTS IN 1957, 1960 AND 1962,
Army Biological Labs Frederick Md
For primary bibliographic entry see Field 6E.
AD-650 888 HC$3.00 MF$0.65

HEREDITARY TRANSMISSION OF PLAGUE RESISTANCE IN PALLASIOMYS MERIDANUS,
Army Biological Labs Frederick Md
For primary bibliographic entry see Field 6C.
AD-650 889 HC$3.00 MF$0.65

CURRENT STATE OF SMALLPOX PROPHYLAXIS,
Army Biological Labs Frederick Md
For primary bibliographic entry see Field 6E.
AD-650 890 HC$3.00 MF$0.65

OBSERVATIONS ON THE ROLE OF THE REACTIVITY OF GREAT GERBILS TO P. PESTIS DURING THE DEVELOPMENT OF THE EPIZOOTOLOGICAL PROCESS. IV. EXPERIENCE IN USING THE PASSIVE HEMAGGLUTINATION REACTION IN A STUDY OF THE NATURAL PLAGUE FOCUS IN THE MUYUN KUM,
Armed Forces-Nrc Committee on Bio-Astronautics Washington D C
For primary bibliographic entry see Field 6C.
AD-650 891 HC$3.00 MF$0.65

Group 6M — Microbiology

METHODICAL BASES FOR THE STUDY OF THE BIOLOGICAL PROPERTIES OF THE PLAGUE CAUSATIVE AGENT,
Army Biological Labs Frederick Md
M. I. Levi. Apr 66, 29p Rept no. Trans-1689
TT-67-61626
Trans. of Elistinskaya Protivochumnaya Stantsiya. Sbornik Nauchnykh Rabot (USSR), n2 p9-35 1961.

Descriptors: (*Pasteurella pestis, Viability), Culture media, Laboratory animals, Resistance (Biological), Septicemia, Disease vectors, Dosage, Antigens + antibodies, Immunity, Adaptation (Physiology), Mutations, Histology, Pathology.

The investigations of the biological characteristics of the various strains of the plague causative agent are significant in the theory of adaptation mutability. The method used in studying the biological properties of the plague microbe consisted of four sections: cultural properties, virulence, bacteremia, and antigenic structure. A study was made of 11 strains of the plague causative agent from various natural foci.
AD-650 892 HC$3.00 MF$0.65

CONTRIBUTIONS TO A STUDY OF THE RELATIONS OF SOME TYPES OF P. PESTIS IN MIXED CULTURES,
Armed Forces-Nrc Committee on Bio-Astronautics Washington D C
L. N. Klassovskii, and L. I. Terenteva. Dec 65, 5p Rept no. Trans-1710
TT-67-61627
Trans. of Nauchnaya Konferentsiya po Prirodnoi Ochagovosti i Profilaktike Chumy, Alma Ata, Feb 63. Materialy, n.p., p106-8.

Descriptors: (*Pasteurella pestis, Growth), Identification, Culture media, Resistance (Biological), Streptomycins, Sensitivity, USSR.

Four variants of plague bacteria were studied: (1) a sensitive to streptomycin (S-), glycerol-negative (G-), rhamnose-negative (R-) variant of the EV strain (EV-S-G-R). (2) a highly resistant to streptomycin variant of the EV strain (EV S + G - R -); (3) a sensitive to streptomycin variant of the glycerol- and rhamnose-positive 1125 strain (1125 S-G+R+); (4) a highly resistant to streptomycin variant of the 1125 strain (1125 S+S+R+).
AD-650 893 HC$3.00 MF$0.65

AN EXPERIMENTAL STUDY OF SIMULTANEOUS VACCINATION AGAINST TULAREMIA AND TUBERCULOSIS,
Army Biological Labs Frederick Md
For primary bibliographic entry see Field 6E.
AD-650 894 HC$3.00 MF$0.65

EFFECT OF SEWAGE TREATMENT ON RECOVERY OF POLIOVIRUS FOLLOWING MASS ORAL IMMUNIZATION,
Naval Medical Research Unit No 4 Great Lakes Ill
For primary bibliographic entry see Field 6E.
AD-650 937 Not available from CFSTI.

METABOLIC ACTIVITY OF THE TRENCH FEVER RICKETTSIA, RICKETTSIA QUINTANA,
Naval Medical Research Inst Bethesda Md Dept of Microbiology
Kun-yen Huang. 24 Oct 66, 9p
NAVMED-MR-005.09.0007-22
Availability: Published in Journal of Bacteriology v93 n3 p853-9 Mar 1967.

Descriptors: (*Rickettsia, Metabolism), Glutamic acid, Glutamine, Oxygen consumption, Enzymes, Chromatographic analysis, Labeled substances, Carboxylic acids, Radioactive isotopes.

A study of the metabolic activity of Rickettsia quintana was carried out by conventional Warburg and radioisotope techniques with intact cells harvested while growing in the fluid counterpart of the medium of Vinson and Fuller. Like other rickettsiae, R. quintana did not utilize glucose, but did metabolize glutamate and glutamine. Unlike typhus rickettsiae, R. quintana did not require a diluent high in K (+) for metabolic activity, and it utilized glutamine more efficiently than glutamate. In typical experiments, this microorganism produced 1.6 to 2.0 micromoles of CO2 from glutamine per mg of rickettsial protein per hr at 37 C, while consuming 1.5 to 1.7 micromoles of O2. R. quintana also utilized, in descending order, succinate, alpha-ketoglutarate, glutamate, pyruvate, and citrate; the first-named substrate was utilized more rapidly than glutamine. R. quintana, like typhus rickettsiae, has a glutamate-oxaloacetate transaminase because aspartate was isolated, by means of thin-layer chromatography, as one of the end products of the utilization of glutamine. When the microorganisms were incubated with glutamine-14C and unlabeled intermediates of the citric acid cycle, labeled dicarboxylic acids of the cycle were recovered. Labeled tricarboxylic acids, however, were not recovered, possibly because of cellular impermeability to the corresponding unlabeled intermediates. (Author)
AD-650 940 Not available from CFSTI.

EFFECT OF STAPHYLOCOCCAL ENTEROTOXIN B ON THE ELECTROENCEPHALOGRAM OF MONKEYS,
Army Medical Unit Frederick Md
Leland F. Hodoval, Earl L. Morris, Dennis D. Elsberry, and William R. Beisel. 16 Nov 66, 5p
Availability: Published in Applied Microbiology v15 n2 p403-6 Mar 1967.

Descriptors: (*Staphylococcus, Toxins + antitoxins), (*Toxins + antitoxins, *Electroencephalography), Central nervous system, Monkeys, Dosage, Shock (Pathology), Toxicity.

A highly purified preparation of staphylococcal enterotoxin B was administered intravenously, 1 mg/kg, to rhesus monkeys. Electroencephalograms (EEG) were recorded from electrodes attached to the skin or implanted on the dura. The dose of toxin employed consistently produced a sequence of vascular collapse followed by death; in control studies, animals were bled periodically to produce a similar pattern of shock. Regardless of the time to death following administration of the enterotoxin, there were essentially no changes from base line EEG patterns until shortly before death. With the development of preterminal severe shock, there was a marked decrease in EEG wave frequency and an initial increase in amplitude. The latter diminished progressively to produce an isoelectric tracing immediately prior to death. This could be reversed for a brief period by epinephrine. An identical sequence of EEG changes was observed during the terminal period of hemorrhagic shock. It is postulated that cerebral anoxia, caused by inadequate blood flow, is the primary cause of the altered EEG patterns that accompany enterotoxin toxicity. In this respect, staphylococcal enterotoxin B produces changes apparently similar to bacterial endotoxin but distinctly different from the EEG effects reported after botulinum toxin, anthrax toxin, or rattlesnake and cobra venom. (Author)
AD-650 957 Not available from CFSTI.

STUDIES ON PLAQUE VARIANTS OF COXSACKIEVIRUS B5 BY BURST ANALYSES,
Defence Chemical Biological and Radiation Labs Ottawa (Ontario)
Jack Konowalchuk, and Joan I. Speirs. 22 Jun 66, 9p
Availability: Published in Canadian Journal of Microbiology v13 p167-72 1967.

Descriptors: (*Coxsackie virus, Morphology (Biology)), Tissue culture, Genetics, Tissue culture cells, Culture media, Growth, Canada.

Propagation of coxsackievirus B5 on cell lines revealed two variants, one that yields small plaques and is stable and another that is large but variable in size. Multiple-burst studies on the large-plaque pool showed the existence of two different population sections. Analysis of a sample from a plaque belonging to the small population section showed a progeny of small plaques while a similar analysis from a plaque in the large population section produced plaques of varying size but whose mean plaque diameter resembled that of the parent culture. Repeated selection for smallness from plaques in the large population section resulted in small plaques and a shift from the large to the small population section. Analysis of the small pool virus on monkey kidney monolayers revealed the presence of a few typical monkey kidney plaques which differed from normal monkey kidney plaques by producing only small plaques on HEp-2 monolayers. (Author)
AD-651 078 Not available from CFSTI.

CONCERNING THE VARIABILITY OF THE PLAGUE VACCINE STRAIN EV,
University Coll of Wales Aberystwyth Uk
M. D. Zhurba, M. D. Pryadkina, and G. F. Abramova. Sep 66, 7p Rept no. Trans-1935
TT-67-61699
Trans. of Zhurnal Mikrobiologii, Epidemiologii i Immunobiologii (USSR), v43 n4 p64-6 1966.

Descriptors: (*Pasteurella, Vaccines), Immunology, Mutations, Bacteriophages, Growth, Culture media, Morphology (Biology), Toxicity, Preparation, USSR.

Over a period of many years the plague microbe vaccine strain EV has been used successfully for the preparation of dry live vaccine. It has proven itself as the most stable vaccine strain, preserving its initial properties under favorable conditions (in a freeze dried state). There is great interest in data indicating the possibility of the directed mutability of this strain and in conditions furthering the development of hereditary changes in its cultural and immunogenic properties. Cases have been described in the literature when under the influence of plague bacteriophage mutants have been obtained which differed sharply from the initial culture of the plague microbe based on their cultural-biochemical properties. It is also known that after prolonged maintenance on nutrient media there may be a lowering in the immunogenicity of cultures of the EV vaccine strain. At the present time the NIIEG variant is the most full-valued of the various variants of this strain. In this paper a study is made of the properties of two variants of the EV strain which originated under completely different conditions. (Author)
AD-651 135 HC$3.00 MF$0.65

IMMUNIZATION OF MAN WITH THE LIVE M-44 Q-FEVER VACCINE,
Army Biological Labs Frederick Md
For primary bibliographic entry see Field 6E.
AD-651 136 HC$3.00 MF$0.65

BIOSYNTHESIS OF STAPHYLOCOCCAL PHAGE ON CELL FREE BACTERIAL MEDIA,
Army Biological Labs Frederick Md
P. A. Bulanov. Dec 65, 5p Rept no. Trans-1728
TT-67-61697
Trans. of Akademiya Navuk BSSR, Minsk. Doklady, v8 n9 p607-8 1964.

Descriptors: (*Bacteriophages, Biosynthesis), Culture media, Staphylococcus aureus, Amino acids, Muramidase, Adenosine phosphates, USSR.

Up until now it was considered solidly established that viruses and phages as obligate parasites may

multiply only in living cells which are susceptible to the given virus or phage. However, in 1961 the possibility of the synthesis of the poliomyelitis virus from viral RNA in the system of destroyed cells of a monkey kidney with the addition of certain amino acids, nitrogenous bases and enzymes was reported. In 1962 reports were published on the multiplication of the tobacco mosaic virus in a system which did not contain living cells. Various nucleotides (adenosine-, guanosine-, cytidine- and uridene-triphosphates) were entered into this system. The addition to such a medium of the purified sap from plants which were afflicted with the tobacco mosaic virus causes the rapid multiplication of new viral particles. In this way the biosynthesis of viruses on media which do not contain living cells was demonstrated. The tests reported in this paper, on the biosynthesis of staphylococcal phage, were conducted on cell-free bacterial lysates.

AD-651 137 HC$3.00 MF$0.65

CONTRIBUTIONS TO THE STUDY OF F. TULARENSIS STRAINS ISOLATED IN SOUTHERN EUROPE,

Army Biological Labs Frederick Md

N. G. Olsufyev, and O. S. Yemelyanova. Sep 66, 5p Rept no. Trans -1936

TT-67-61696

Trans. Zhurnal Mikrobiologii, Epidemiologii i Immunobiologii (USSR) n5 p3-4 1966.

Descriptors: (*Pasteurella tularensis, Viability), Culture media, Growth, Infections, Diseases, Dosage, Morphology (Biology), Europe, USSR.

Identifiers: Francisella tularensis.

It was concluded that the F. tularensis strains isolated in Eastern (Bulgaria) and in Western Europe (Italy) do not differ in their properties from the typical palaearctic strains discovered in the USSR, Poland, France, China and also the palaearctic strains circulating in the western states of North America.

AD-651 138 HC$3.00 MF$0.65

A NEW GLYCOLIPID SULFATE ESTER IN HALOBACTERIUM CUTIRUBRUM,

National Research Council of Canada Ottawa (Ontario) Div of Biosciences

For primary bibliographic entry see Field 6A.

AD-651 165 Not available from CFSTI.

THE USE OF HIGUCHI-SMITH MEDIUM FOR IMPROVING THE IMMUNOGENIC PROPERTIES OF PLAGUE VACCINE STRAINS,

Army Biological Labs Frederick Md

N. G. Ponomarev. Apr 66, 8p Rept no. Trans-1670

TT-67-61702

Trans. of Zhurnal Mikrobiologii, Epidemiologii i Immunobiologii (USSR) v42 n10 p43-7 1965.

Descriptors: (*Pasteurella pestis, Vaccines), Culture media, Immunity, Effectiveness, Dosage, USSR.

By means of selection on the Higuchi-Smith medium P. pestis variants which possess a high immunogenic activity were obtained. When using the stated method, variants with a somewhat more expressed immunological effectiveness are obtained from the approved EV vaccine strain. By the method of selection on a medium with a deficit of calcium a subculture from a degraded vaccine strain was isolated with an immunological activity which was not subordinate to the activity of the industrial EV strain. By means of the selection of the appropriate subcultures on the Higuchi-Smith medium the immunization activity of commercial vaccine strains was maintained at the proper level. (Author)

AD-651 168 HC$3.00 MF$0.65

THE POSITION OCCUPIED BY VACCINE 'ATTENUATED' STRAINS OF BACTERIA IN THE SYSTEM OF MICROORGANISMS,

Army Biological Labs Frederick Md

R. A. Saltykov. Apr 66, 9p Rept no. Trans-1685

TT-67-61704

Trans. of Zhurnal Mikrobiologii, Epidemiologii i Immunobiologii (USSR), v42 n9 p126-9 1965.

Descriptors: (*Vaccines, Viability), Bacillus anthracis, Pasteurella pestis, Pasteurella tularensis, Preparation, Immunity, Dosage, USSR.

An attempt was made to establish the taxonomic category and rational nomenclature of 3 vaccine strains: Anthrax STI-1 Ginsburg, tularemia No 15 Gayskiy, and the EV Plague of Girard and Robic.

AD-651 170 HC$3.00 MF$0.65

EXPERIMENTAL MASS INFECTION OF LICE ADAPTED TO FEEDING ON RABBITS WITH RICKETTSIA PROWAZEKI,

Army Biological Labs Frederick Md

For primary bibliographic entry see Field 6C.

AD-651 173 HC$3.00 MF$0.65

ADAPTATION OF NEWCASTLE VIRUS TO MAMMALS,

Army Biological Labs Frederick Md

For primary bibliographic entry see Field 6C.

AD-651 174 HC$3.00 MF$0.65

COMPARATIVE CYTOFLUOROMETRIC STUDY OF THE DNA CONTENT IN HIGH POLYPLOIDY CELL NUCLEI STAINED WITH ACRIDINE ORANGE AND FLUORESCENT SCHIFF-TYPE REAGENT,

Army Biological Center Frederick Md

A. A. Zotikov. 24 Nov 64, 9p Rept no. Trans-1928

TT-67-61709

Trans. of Akademiya Nauk SSSR. Izvestiya. Seriya Biologicheskaya, v30 n6 p921-5 1965.

Descriptors: (*Ciliata, Desoxyribonucleic acids), (*Nuclei (Biology), Desoxyribonucleic acids), (*Desoxyribonucleic acids, *Cytochemistry), (*Biological stains, Fluorescence), Dyes, Cell structure, Chromosomes, Protozoa, Ribonucleic acids, Microscopy, Nucleoproteins, USSR.

Identifiers: Acridine dyes, Schiff's bases, Tetrahymena.

An investigation of the macronucleus of Tetrahymena pyriformis, stained with fluorescent Schiff-type reagent (auramine 0-SO2) in the Feulgen reaction, showed that the cytofluorometric method may be used to determine the relative amounts of DNA even in high polyploidy cellular nuclei. When RNA has been removed from the cells it is possible to judge the condition of the DNA-protein based on measurements of the intensity of fluorescence of the cell nuclei, stained with acridine orange. The two methods are complementary in the investigation of cell nuclei by the cytofluorometric method. (Author)

AD-651 175 HC$3.00 MF$0.65

ANTIHEMAGGLUTINATING ANTIBODY SPECTRUM FOLLOWING EXPERIMENTAL IMMUNIZATION WITH TICK-BORNE ENCEPHALITIS VIRUSES,

Army Biological Labs Frederick Md

K. K. Lvov, V. A. Zaklinskaya, M. P. Chumakov, and L. S. Levina. Jul 66, 13p Rept no. Trans-1816

TT-67-61710

Trans. of Voprosy Virusologii (USSR), v10 n6 p657-63 1965.

Descriptors: (*Arboviruses, Serodiagnosis), Ticks, Disease vectors, Immunity, Antigens + antibodies, Volumetric analysis, USSR.

A study was made of the regularities of formation and the dynamics of homologous and heterologous antihemagglutinins, developing after immunization of animals with the eastern and western strains of tick-borne encephalitis and the viruses of Scotland encephalomyelitis of sheep, Omsk hemorrhagic fever, Kyasanur forest disease, Langat, Powassan and Negishi. The differences in the dynamics of homologous and heterologous antihemagglutinins after hypo- and hyperimmunization and reimmunization bear a quantitative nature. Immunization with any strain of tick-borne encephalitis virus leads to the formation of antihemagglutinating antibodies on an equal level to all the remaining strains related to this virus. There is a simultaneous formation of antibodies to all the other representatives of this group, but in lower titers. For the viruses of Omsk hemorrhagic fever, Langat, Scotland encephalomyelitis of sheep and Negishi the difference in titers of antibodies reach large differences, if the antibodies are determined against the viruses of Kyasanur forest disease (3--5 log) and especially Powassan (5--7 log). Immunization with any other virus of the subgroup, except Powassan, also leads to the appearance of antibodies to the remaining representatives of the complex. The titers of antibodies here are lower by 1-3 log than to the homologous virus. (Author)

AD-651 176 HC$3.00 MF$0.65

DETERMINATION OF THE PHYSICAL PARAMETERS OF VIRAL AEROSOLS,

Fort Detrick Frederick Md

A. I. Gromyko, I. Ya. Vlasenko, and I. I. Terskikh. Oct 66, 11p Rept no. Trans-1944

TT-66-33780

Trans. of Zhurnal Mikrobiologii, Epidemiologii i Immunobiologii (USSR) n6 p83-8 1966.

Descriptors: (*Aerosols, Physical properties), Particle size, Accuracy, Viruses, Microscopes, USSR.

For the study of the physical properties of infectious and vaccine aerosols it is possible to use the continuous ultramicroscope, based on the principle of calculating particles in an uninterrupted stream of air. It was demonstrated that it was feasible to use it for determining the concentration and particle size composition of a biological aerosol. It was established that using the continuous ultramicroscope it is possible with sufficient accuracy to determine the time for the maximum saturation of the chamber with the aerosol. Corrections were introduced into the calculations made earlier. (Author)

AD-651 179 HC$3.00 MF$0.65

EPIDEMIOLOGICAL CHARACTERISTICS OF A FOCUS OF TICK-BORNE ENCEPHALITIS IN PRESAYAN (IRKUTSK OBLAST),

Army Biological Labs Frederick Md

For primary bibliographic entry see Field 6E.

AD-651 180 HC$3.00 MF$0.65

OBSERVATIONS ON THE VARIABILITY OF THE PLAGUE BACILLUS IN THE FLEAS. II. PASSAGE OF THE AVIRULENT SUBCULTURE 610-A THROUGH FLEAS AND PREGNANT GUINEA PIGS,

Army Biological Labs Frederick Md

N. M. Khrusteselevskaya, V. A. Bibikova, and L. M. Osadchaya. Apr 66, 4p Rept no. Trans-1684

TT-67-61715

Trans. of mono. Nauchnaya Konferentsiya po Prirodnoi Ochagovosti i Profilaktike Chumy, Alma Ata, Feb 63. Materialy, n.p., p233-5.

Descriptors: (*Pasteurella pestis, Viability), (*Siphonaptera, Pasteurella pestis), Guinea pigs, Pregnancy, Septicemia, Mortality rates, Mice, USSR.

Results showed that the avirulent properties of the 610-A subculture, which remained the same following its passage through the organism of 'normal' susceptible animals, under other conditions (passage through the organism of pregnant guinea pigs or as a result of prolonged residence in the gastro-intestinal tract of active plague carriers -- the fleas X. cheopis and X. minax) may change to the side of a noticeable increase of virulence. The possibility of the transmission of the subculture under study from infected fleas during bloodsucking supplements the data obtained, which strongly sheds a certain light on the variability of the causative agent under natural conditions. (Author)
AD-651 196 HC$3.00 MF$0.65

SEROLOGICAL INTERRELATIONSHIPS BETWEEN THE PLAGUE MICROBE AND BACTERIA OF THE INTESTINAL GROUP,
Army Biological Labs Frederick Md
R. S. Mikhailova. Dec 65, 9p Rept no. Trans-1717
TT-67-61716
Trans. of Armyanskaya Protivochumnaya Stantsiya, Erevan. Trudy (USSR) n3 p143-51 1964.

Descriptors: (*Pasteurella pestis, Antigen-antibody reactions), (*Enterobacteriaceae, Antigen-antibody reactions), Serodiagnosis, Adsorption, Volumetric analysis, Immune serums, USSR.

During an investigation of 346 strains of P. pestis with the agglutinating sera of bacteria of the intestinal group a positive result was obtained in 31 cases (8.9%). Plague serum agglutinated 46 cultures of enterobacteria from various species out of 165 checked (27.8%). In the tests of the cross reactions of agglutination and antibody adsorbtion, the presence of common antigenic components was supported in some of the strains of the plague microbe and enterobacteria. The presence in strains of P. pestis of antigens which are inherent to bacteria of the intestinal group was not connected with other biological properties of the cultures, and the stated feature, judging by the data obtained, cannot be used for the intraspecies grouping of strains of the plague microbe. (Author)
AD-651 197 HC$3.00 MF$0.65

MATERIALS CONCERNING THE BIOLOGY OF THE PSEUDOTUBERCULOSIS BACTERIOPHAGE,
Army Biological Labs Frederick Md
M. A. Shashaev. Dec 65, 4p Rept no. Trans-1718
TT-61717
Trans. of mono. Nauchnaya Konferentsiya po Prirodnoi Ochagovosti i Profilaktike Chemy, Alma Ata, Feb 63. Materialy, n.p., p256-8.

Descriptors: (*Pasteurella pseudotuberculosis, *Bacteriophages), Immune serums, Neutralization, Pasteurella pestis, Reproduction (Physiology), USSR.

The data shows that the plague and pseudotuberculosis bacteriophages are quite different from each other serologically and make up independent serological groups. A single cycle of multiplication of the pseudotuberculosis phages of Kotlyarovaya and D'Erell was studied according to the method of Ellis and Delbruk (1939). The duration of the latent period for Kotlyarovaya phase turned out to be equal to 20 minutes, and for D'Erell phage -- 21 minutes. The average 'harvest' of phage particles for one infected bacterial cell comprised 92 for the Kotlyarovaya phage, and 82 for the D'Erell phage. Based on the duration of the latent period the test strains of the pseudotuberculosis bacteriophage hardly differed from the plague phages. (Author)
AD-651 198 HC$3.00 MF$0.65

6O. PHARMACOLOGY

L'ACTION DES CATIONS ALCALINO-TERREUX SUR LES TRANSMISSIONS NEUROMUSCULAIRE ET SYNAPTIQUES (Effect of Alkaline Earth Cations on Neuromuscular and Synaptic Transmission),
Brussels Univ (Belgium)
J. E. Desmedt. 1963. 45p
Grant AF-EOAR-46-63
Text in French.
Availability: Published in Handbook of Experimental Pharmacology -- Supplementary Volume, v17 a1 p293-336 1963.

Descriptors: (*Neuromuscular transmission, Pharmacology), Muscles, Calcium, Responses, Nerves, Stimulation, Electrophysiology, Magnesium, Acetylcholine, Skeletal muscle relaxants, Strontium, Barium, Autonomic agents, Belgium.

Contents: Neuromuscular transmission; synaptic transmission in sympathetic ganglia; and the synaptic transmission in the central nervous system.
AD-650 728 Not available from CFSTI.

ELECTROPHYSIOLOGICAL STUDY OF NEUROMUSCULAR BLOCKING ACTION OF COBRA NEUROTOXIN,
National Taiwan Univ Taipei• Pharmacological Inst
For primary bibliographic entry see Field 6T.
AD-650 774 Not available from CFSTI.

DISTRIBUTION OF BUNGARUS MULTICINCTUS VENOM FOLLOWING ENVENOMATION,
National Taiwan Univ Taipei Pharmacological Inst
For primary bibliographic entry see Field 6T.
AD-650 775 Not available from CFSTI.

RESISTANCE OF LONG-LIVED LYMPHOCYTES AND PLASMA CELLS IN RAT LYMPH NODES TO TREATMENT WITH PREDNISONE, CYCLOPHOSPHAMIDE, 6 MERCAPTOPURINE, AND ACTINOMYCIN D,
Naval Radiological Defense Lab San Francisco Calif
J. J. Miller, III, and L. J. Cole. 20 Feb 67, 28p
Rept no. USNRDL-TR-67-24
NAVMED-MR005.08-0005

Descriptors: (*Transplantation, Immunology), (*Chemotherapeutic agents, Immunology), (*Antigen-antibody reactions, Resistance (Biological)), (*Lymphocytes, Radiation effects), Thymidines, Tritiated compounds, Dosage, Labeled substances, Histology, Lymphatic system, Immunity.
Identifiers: Plasma cells, Prednisone, Cyclophosphamide, Mercaptopurines, Actinomycins.

The cells of the popliteal lymph nodes of rats were labeled for four days after a secondary immunological stimulus. Thirty-one days after the last dose of tritiated thymidine, groups of rats were started on courses of daily, intraperitoneal injections of prednisone, cyclophosphamide, 6-mercaptopurine, or actinomycin D. The initially low doses of these agents were doubled on successive weeks until either lymphoid hypoplasia or death occurred. Rats from each group were killed weekly, and the percentages of persisting, labeled small lymphocytes in the popliteal nodes were determined. Sections of these nodes were examined for persisting, labeled plasma cells. The percent of lymphocytes labeled increased while the total number of lymphocytes decreased during treatment with prednisone and cyclophosphamide. Prednisone decreased the numbers of long-lived plasma cells, but these cells were preferentially resistant to cyclophosphamide. Neither 6-mercaptopurine nor actinomycin D had an appreciable effect on lymphoid tissues histologically nor on the proportions of labeled, long-lived lymphocytes and plasma cells before causing the deaths of the rats receiving them. These results indicate that long-lived lymphocytes and plasma cells survive treatment with the immunolytic drugs studied, and that long-lived lymphocytes are specifically resistant to prednisone and cyclophosphamide. It is believed that these results have an application to the attempts to find drugs useful in the treatment of immunologic rejections of organ transplants and for therapy of autoimmune diseases. (Author)
AD-650 863 HC$3.00 MF$0.65

IONS, DRUGS AND THE AXON MEMBRANE,
Naval Medical Research Inst Bethesda Md
David E. Goldman, and Mordecai P. Blaustein.
14 Jul 66, 17p
NAVMED-MR-005.08.0001-8, NAVMED-005.08-0020.02
Availability: Published in Annals of the New York Academy of Sciences v137 Art2 p967-81 Jul 14 1966.

Descriptors: (*Local anesthetics, *Nerve cells), Peripheral nervous system, Ions, Membranes (Biology), Electrophysiology, Transport properties, Sodium, Potassium, Calcium, Voltage, Inhibition, Chemical compounds, Drugs.
Identifiers: Cocaine, Tropine, Tetrodotoxin.

Excitation and conduction in axons can be strongly affected by a large number of chemical substances. Extensive data are available in the literature on the action of ions, narcotics, blocking agents, detergents, toxins, etc. on nervous tissue. However, much of the information is not suitable for analytical studies on axons. The controlled application of substances to an isolated axon under a voltage clamp permits a quantitative study of their action on the membrane, especially on its ion flow control mechanisms. It is convenient to classify compounds according to their ionic charge, water solubility, lipid solubility, molecular size and steric specificity, although there may be other relevant factors. The classification of the biological effects is much more complicated. Certain effects, such as calcium-like activity, blocking action on sodium or potassium transfer, enzyme action and denaturing or precipitating action on proteins, are more or less well defined. Narcotic and detergent effects as well as depolarizing action, appear to be more diffuse phenomena. A given compound may produce several effects and the relative degree to which it exhibits them may vary with concentration or environmental factors. Most divalent ions are primarily calcium-like in their action. Many cocaine and tropine derivates show both calcium like and blocking activity. Certain cations may act primarily as protein denaturants. Tetrodotoxin seems to exert almost solely a blocking action on sodium transfer. (Author)
AD-650 936 Not available from CFSTI.

DRUG REACTIONS IN THE FIELD OF PATHOLOGY,
Armed Forces Inst of Pathology Washington DC
For primary bibliographic entry see Field 6E.
AD-650 956 Not available from CFSTI.

6P. PHYSIOLOGY

THE EFFECT OF LARGE INTERAURAL TIME DIFFERENCES UPON THE JUDGMENT OF SIDEDNESS,
Texas Univ., Austin. Defense Research Lab.
Hugh C. Blodgett, W. A. Wilbanks, and Lloyd A. Jeffress. 19 Aug 54, 35p DRL-A-83
Contract NObsr-52267

Descriptors: (*Hearing, *Thresholds (Physiology)), Determination, Noise, Psychoacoustics, Tests, methods.

Klumpp has recently shown that, when clicks are presented binaurally with a small time delay in the circuit to one earphone, the minimal interaural time difference discriminable as a shift in the loca-

tion of the sound image is of the order of 6 microseconds. Klumpp found that with delays increasing steadily from zero time difference to about 1 ms the sound image moved laterally, reaching a 90 degree position on the side of the leading ear. Through increasing delays up to several ms it remains in this position. As more delay is added the sound loses phenomenal compactness, becomes more and more diffuse, eventually losing all sidedness. It is now indistinguishable from uncorrelated noise. The length of delay required to bring about this complete loss of sidedness gives the limiting value within which time differences can be employed in the localization of noise. It gives, in other words, a measure of the temporal range through which the auditory mechanism is able to effect a correlation between the displaced events occurring, now, as random events at the two ears. (Author)
AD-42 452 HC$3.00

MONITORING PSYCHOMOTOR RESPONSE TO STRESS BY EVOKED AUDITORY RESPONSES,
School of Aerospace Medicine, Brooks AFB, Tex.
For primary bibliographic entry see Field 5J.
AD-471 880 HC$3.00 MF$0.65

EFFECT OF ISOLATION IN A CONSTANT ENVIRONMENT ON PERIODICITY OF PHYSIOLOGICAL FUNCTIONS AND PERFORMANCE.
Joint rept.,
Naval Submarine Medical Center Groton Conn
Karl E. Schaefer, Bruce R. Clegg, Charles R. Carey, J. H. Dougherty, and B. B. Weybrew. 3 Feb 67, 61p Rept no. NSMC-488
NAVMED-MR-005.04-0058.03
NASA Order-R-24

Descriptors: (*Confined environments, *Rhythm (Biology)), Psychophysiology, Diurnal variations, Responses, Sleep, Body temperature, Respiration, Pulse rate, Electroencephalography, Adaptation (Physiology), Adjustment (Psychology), Urine, Saliva, Psychomotor tests, Personality, Performance tests, Electrocardiography, Excretion, Stress (Physiology).
Identifiers: Wakefulness.

In an effort to determine the extent to which the day/night cycles of physiological and psychological functions normally synchronized with the environment in 24-hour cycles might change in isolation in an environment where there were no external clues, two medical students were studied. These subjects were isolated for nine days in a constant environment, in which temperature, humidity, barometric pressure, light intensity, and noise levels were closely controlled. In brief, the findings showed that they experienced a shift of 1.7 hours away from local clock time. Their average total periodicity being 25.8 hours. The cycles of body temperature, pulse rate, and basal skin resistance followed the phaseshift of the sleep-wakefulness cycle, while the cycle of respiratory rate became dissociated in both subjects. Most of the urine functions remained synchronized for five days but dissociated from the sleep-wakefulness cycle during the subsequent three days of the isolation period. The two subjects were of different body build and demonstrated distinctly different personality trait configurations, which were reflected in their temporal organization. Twelve-hour and six-hour periodicities were shown by power spectral analysis to dominate temporarily the 24-hour periodicity cycle during the adjustment to and recovery from the effects of isolation, in heart-rate, body temperature, and basal skin resistance, and respiratory rate of both subjects. This temporary breakdown of the temporal organization might be involved in the subjectively experienced difficulties of adjustment to living in a constant environment. (Author)
AD-650 671 HC$3.00 MF$0.65

RELEASE OF CHEMICAL FACTORS FROM THE DIENCEPHALIC REGION OF THE UNANAESTHETIZED MONKEY DURING CHANGES IN BODY TEMPERATURE,
Purdue Univ Lafayette Ind Lab of Neuropsychology
R. D. Myers. 1966, 2p
Contract N0014-67-A-0226-003, Grant NSF-GB-3874
Research supported in part by Wallace Labs.
Availability: Published in Journal of Physiology v188 p50-1.

Descriptors: (*Body temperature, Biochemistry), Amines, Thalamus, Neurology, Physiology, Shivering, Hypothermia, Monkeys.

When the donor monkey is cooled by placing dry ice into its chair chamber and its third ventricle is tapped 15-30 min after the onset of shivering, repeated cross-infusions of the effluent to the third ventricle of the recipient monkey causes shivering of the recipient within 2-5 min of the first infusion and an immediate rise in its temperature. The degree of hyperthermia may exceed 2C and the duration varies between 6 and 12 hr. If the donor monkey is warmed by blowing hot air into its chair chamber and the third ventricle tapped 30 min later, repeated cross-infusions of its c.s.f. to the recipient monkey causes a fall in the temperature of the recipient which varies considerably in magnitude. The period of hypothermia which may last for as long as 4 hr, is usually followed by a rise in temperature lasting from 4 to 8 hr. Placement of the cannula in either donor or recipient monkey appears to be a critical factor with respect to the magnitude of the temperature change of the recipient following a cross-infusion. In control experiments, cross-infusions of c.s.f. between the third ventricles of pairs of monkeys has no notable effect, and hence the c.s.f. of primates seems to be biologically compatible. (Author)
AD-650 733 Not available from CFSTI.

THE FREE AMINO ACIDS IN THE PLASMA AND URINE OF HUMAN SUBJECTS ON A VITAMIN B6-DEFICIENT DIET,
Army Medical Research and Nutrition Lab Denver Colo
For primary bibliographic entry see Field 6A.
AD-650 767 Not available from CFSTI.

A COMPARATIVE STUDY OF PLETHYSMOGRAPHIC WAVES DERIVED FROM THE HEAD BY IMPEDANCE AND PHOTOELECTRIC TECHNIQUES,
Maryland Univ Baltimore Dept of Neurology
Albert F. Heck. 1966, 4p
Contract DA-49-193-MD-2229
Availability: Published in Neurology v17 n1 p41-4 Jan 1967.

Descriptors: (*Brain, Electrical impedance), Electroencephalography, Electrophysiology, Phototubes, Fiber optics, Monkeys, Cats, Blood circulation.
Identifiers: Rheoencephalography, Plethysmography.

Controversy surrounding the use of electrical impedance plethysmography for detection of intracranial vascular phenomena centers on the origin of the waves derived from the head by this technique, that is, whether rheoencephalographic waves reflect vascular phenomena of the internal carotid circulation or of the external carotid circulation in the scalp. This problem was investigated by means of a new technique employing flexible optic probes for derivation of simultaneous, differential, photoelectric, optical density plethysmograms from the surface of the cerebral cortex within the closed skull and from the ipsilateral ear of experimental animals in both the acute and chronic state. Results of these experiments indicate that there is a phase difference between the pulsations of the intracranial and extracranial circulation and that the rheoencephalogram largely reflects pulsation in the extracerebral circulation. (Author)
AD-650 786 Not available from CFSTI.

IONS, DRUGS AND THE AXON MEMBRANE,
Naval Medical Research Inst Bethesda Md
For primary bibliographic entry see Field 6O.
AD-650 936 Not available from CFSTI.

EFFECT OF HYPERTONIC SALINE INJECTIONS AND WATER DEPRIVATION ON DRINKING, SERUM OSMOLALITY AND GUT WATER,
Syracuse Univ N Y Physiological Psychology Lab
For primary bibliographic entry see Field 5J.
AD-650 974 Not available from CFSTI.

HEMODYNAMIC ALTERATIONS PRODUCED BY ARTIFICIAL FAT EMULSIONS PERFUSED THROUGH THE ISOLATED RAT LIVER,
Army Medical Research and Nutrition Lab Denver Colo
Robert A. Levine, Norval W. King, and John E. Canham. 1964, 4p
Availability: Published in Unidentified journal.

Descriptors: (*Lipids, *Liver), Parenteral infusions, Metabolism, Colloids, Histology, Cells (Biology), Blood circulation, Toxicity, Rats.

The progressive decrease of neutral fat from the perfusion fluid and the concomitant histologic demonstration of hepatic lipid uptake in these experiments confirms previous observations of other workers utilizing the isolated perfused liver, demonstrating the efficiency of this organ to remove artificial fat emulsions. Both the Kupffer cells and hepatocytes participated in the removal of emulsified fat, but it was not possible in these studies to evaluate the relative importance of these two types of cells in lipid removal by the liver. The mechanism for lipid uptake by the liver remains unknown but ultrastructural observations indicate that lipid entered both Kupffer and parenchymal cells as early as 1 hour following lipid infusion, and that both these cell types participated in the process of lipid removal, at the same time interval, and without exclusion of the other. (Author)
AD-650 989 Not available from CFSTI.

ASCORBIC ACID METABOLISM IN MAN,
Army Medical Research and Nutrition Lab Denver Colo
E. M. Baker, J. C. Saari, and B. M. Tolbert. 1966, 9p
Prepared in cooperation with Colorado Univ., Boulder.
Availability: Published in American Journal of Clinical Nutrition v19 n6 p371-8 1966.

Descriptors: (*Ascorbic acid, Metabolism), Urine, Excretion, Carbon dioxide, Labeled substances, Chromatographic analysis, Ingestion (Physiology), Oxalates.

It is shown that the only known metabolic products of vitamin C in man are oxalate, ascorbic acid and dehydroascorbic acid. In the young, healthy male volunteer subjects studied, the ascorbic acid pool size was 2 or 3 gm. and the turnover half time is about twenty days on ascorbic acid intakes of about 100 mg. per day. (Author)
AD-651 012 Not available from CFSTI.

INFLUENCE OF DIETARY LITHOCHOLIC ACID ON HEPATIC LIPID TRANSPORT,
Army Medical Research and Nutrition Lab Denver Colo
G. A. Leveille, and H. E. Sauberlich. 19 Nov 65, 3p
Availability: Published in Proceedings of the So-

ciety for Experimental Biology and Medicine v121 p816-8 1966.

Descriptors: (*Bile, *Diet), (*Lipids, Liver), Blood chemistry, Cholesterol, Biosynthesis, Blood serum, Mice, Chickens, Lipoproteins.
Identifiers: Lithocholic acid.

Intravenously administered cholesterol-fed chick serum elevated liver cholesterol levels and depressed hepatic cholesterol synthesis in recipient mice. Serum from lithocholic acid-fed chicks, although supplying a greater quantity of cholesterol than that from cholesterol-fed chicks, did not alter cholesterol levels or cholesterol synthesis in liver of recipient mice. The percentage hepatic uptake of cholesterol from serum by liver of recipient mice was significantly enhanced by administration of cholesterol-fed chick serum and was depressed in mice treated with lithocholic acid-fed chick serum. These data are interpreted to indicate that cholesterol in the serum of chicks ingesting lithocholic acid is bound in a lipoprotein complex which does not readily enter the liver cell. (Author)
AD-651 016 Not available from CFSTI.

LACK OF EFFECT OF DIETARY CHENODEOXYCHOLIC ACID ON PLASMA AND LIVER LIPIDS AND THE DUCTULAR CELL REACTION IN THE CHICK,
Army Medical Research and Nutrition Lab Denver Colo
G. A. Leveille, and D. G. Fairchild. 14 Aug 65, 2p
Availability: Published in Poultry Science v44 n6 p1611-2 Nov 1965.

Descriptors: (*Bile, Diet), (*Lipids, Liver), Blood chemistry, Cholesterol, Blood plasma, Histology, Lipoproteins.
Identifiers: Chenodesoxycholic acid.

The data suggest that the response of the chicken to lithocholic acid is not dependent upon the absence of the 12 alpha-hydroxyl group. The previously reported lack of effect of deoxycholic acid (Hunt et al., 1963), further suggests that the absence of the 7 alpha-hydroxyl group is not responsible for the effects of dietary lithocholic acid. Rather, it would appear that the 7 and 12 alpha-hydroxyl groups must both be absent in order to produce biliary proliferation as induced by dietary lithocholic acid. However, the structural requirements for the production of biliary hyperplasia and the associated lipid alterations induced by lithocholic acid have not been established. (Author)
AD-651 018 Not available from CFSTI.

LIPOGENESIS AND ENZYME ACTIVITY IN RAT AND MOUSE EPIDIDYMAL ADIPOSE TISSUE,
Army Medical Research and Nutrition Lab Denver Colo
Gilbert A. Leveille. 22 Nov 65, 3p
Availability: Published in Proceedings of the Society for Experimental Biology and Medicine v121 p1125-7 1966.

Descriptors: (*Lipids, Biosynthesis), (*Adipose tissue, Enzymes), Fatty acids, Oxidoreductases, Acetates, Rats, Mice.

The ability of rat and mouse epididymal adipose tissue to incorporate acetate-1-14C into fatty acids was studied. The activity of glucose-6-phosphate dehydrogenase (G-6-PD), 6-phosphogluconate dehydrogenase (6-PGD), NADP malic dehydrogenase (malic enzyme), NAD malic dehydrogenase, glutamic-pyruvic transaminase (GPT) and glutamic-oxaloacetic transaminase (GOT) in these tissues was also determined. Mouse adipose tissue incorporated significantly more acetate-1-14C into fatty acids and exhibited higher G-6-PD, 6-PGD and malic enzyme activity than comparable tissue from rats. The malic dehydrogenase activity of rat and mouse adipose tissue was not different but was considerably higher than the activity of the other dehydrogenases studied. The activity of GPT was higher in rat adipose tissue, and that of GOT was higher in tissue from mice. The GPT/GOT ratio was higher in rat than in mouse adipose tissue (5.1 vs 1.7). (Author)
AD-651 019 Not available from CFSTI.

PROLONGED GLUTEN ADMINISTRATION IN NORMAL SUBJECTS,
Army Medical Research and Nutrition Lab Denver Colo
Robert A. Levine, Gordon W. Briggs, Richard S. Harding, and Leroy B. Nolte. 1966, 7p
Availability: Published in New England Journal of Medicine v274 p1109-14 May 19 1966.

Descriptors: (*Gluten, Toxicity), Metabolic diseases, Biopsy, Intestines, Antigens + antibodies, Absorption (Biological), Diet, Fats, Bile, Toxic tolerances, Dosage.

Possible harmful effects of prolonged gluten administration were investigated on a metabolic ward in 34 studies of normal subjects. After a two-week control period either 100 to 150 gm. of gluten or 100 gm. of egg whites was added to the daily diet for at least eight weeks. Periodic observations included biopsy and culture of the jejunal mucosa, a systematic search for circulating precipitins to gluten and its by-products and extensive blood, urine, fecal and radiographic studies for malabsorption. Dietary supplementation with as much as 150 gm. of gluten daily did not induce an acute tissue response or circulating antibodies to gluten, suggesting that an intact intestinal mucosa prevents sensitization to dietary proteins. Gastrointestinal absorption remained normal in 14 healthy volunteers given gluten and 10 subjects receiving isocaloric amounts of egg whites or dextrose. Gluten produced minimal changes in fat absorption in 4 of 10 patients with associated nonmalabsorptive diseases. Evidence is presented that gluten, in the presence of concomitant illness, occasionally may compete with fat for the pathways of fat absorption by altering sterol and bile acid metabolism. As a screening test for gluten toxicity, a 100-gm. gluten 'cocktail' was found to be as practical and well tolerated as lower doses previously used by others. (Author)
AD-651 025 Not available from CFSTI.

AN ATAXIA TEST BATTERY NOT REQUIRING THE USE OF RAILS.
Joint rept.,
Naval Aerospace Medical Inst Pensacola Fla
Alfred R. Fregly, and Ashton Graybiel. Dec 66, 22p Rept no. NAMI-985
NAVMED-MR005.04-0021.140
Contract NASA Order-R-93

Descriptors: (*Posture, Equilibrium), (*Equilibrium, Performance tests), Aging (Physiology), Standards, Vestibular apparatus, Vertigo, Deafness, Psychomotor tests.
Identifiers: Ataxia.

Normative standards on a new quantitative ataxia (postural equilibrium) test battery using rails of various widths as platforms were presented in a previous report. The present study reports normative standards of performance on a related battery of ataxia tests with the floor as a platform and employed routinely in the vestibular research program of this laboratory. Significant decreases in performance with age and an apparent superior performance by males were found. The scores of bilateral and unilateral vestibular-defective individuals and of patients referred for testing because of symptoms of vertigo departed significantly from the normative standards. The usefulness of individual tests as well as of the test battery in clinical and research situations was made apparent. (Author)
AD-651 057 HC$3.00 MF$0.65

A THEORETICAL MODEL OF THE CORNE FOR USE IN STUDIES OF TONOMETRY,
Rand Corp Santa Monica Calif
C. C. Mow. A 67, 26p Rept no. P-3584
Presented at the International Corneal Biophysi Workshop (4th), May 9-10, 1967, at the Cedar Sinai Medical Center, Los Angeles, California.

Descriptors: (*Cornea, Deformation), Biophysi Stresses, Elasticity, Mathematical model Ophthalmology.
Identifiers: Tonometry, Glaucoma.

A theoretical model of the cornea, based on co neal dimensions and observed properties, is pr sented. It is shown that because of large differen es in the thicknesses of the Bowman's and Des emet's membranes and the stroma; and becaus of the reported large differences in the elasti properties of the layers, a sandwich-shell mod is a good approximation for the study of corne deformation. The theory is applicable for applan tion tonometry. A set of equilibrium equation based on Reissner's theory is given. Shell parame ers which determine the behavior of shells are e pressed in terms of the corneal properties and d mensions. Numerical examples which show th effects of corneal parameters on the stress resu tants due to intraocular pressure are also give (Author)
AD-651 107 HC$3.00 MF$0.6

APPLICATION OF INFORMATION THEOR TO THE NERVOUS SYSTEM.
Final rept. for 1 Jan-31 Dec 66,
Chicago Univ Ill Committee on Mathematics Biology
H. D. Landahl. Apr 67, 4p
AFOSR-67-0922
Grant AF-AFOSR-370-65
Continuation of Grant AF-AFOSR-370-64. Se also AD-287 857 and AD-632 744.

Descriptors: (*Nervous system, *Information theory), Mathematical models, Semicircular can als, Biophysics, Nystagmus, Masking, Abstracts

Abstracts of three papers are given. The titles ar 'A Neural Net Model for Masking Phenomena' 'An Analysis of the Mechanical Forces in Eac Semicircular Canal of the Cat Under Single an Combined Rotations', and 'A Study on th Biophysical Characteristics of the Cat Labyrinth' A summary of preliminary investigations of Co olis nystagmus is given. (Author)
AD-651 123 HC$3.00 MF$0.6

RECIPROCAL CONTROLS BETWEEN NE VOUS SYSTEM AND ENDOCRINE SECRETIO
Final scientific rept., 1 Apr-30 Sep 66,
Oxford Univ (England) Dept of Human Anatomy
G. W. Harris. Feb 67, 8p
AFOSR-67-0920
Grant AF-EOAR-10-66

Descriptors: (*Hormones, Secretion), Endocrin glands, Nervous system, Control systems, Th roid gland, Pituitary gland, Sex hormones, Ste oids, Reproductive system, Pregnancy, Metabo ism, Thyroid hormones, Thyroxine, Thalamu Cerebral cortex, Stimulation, Adrenocorticotrop hormone, Great Britain.

The investigation was designed to map out som of the forebrain pathways involved in the contr of the anterior lobe of the hypophysis. The hypo thalamus and parts of the cerebral cortex were st mulated with permanently implanted electrode and the release of the adrenocorticotrop (ACTH) and of the thyrotropic (TSH) hormone from the pituitary were measured. A technique was developed by which the continuous stimula tion of the different parts of the brain can b carried on for days at a time. From such prolonge stimulation, the effects of stimulation should b

come evident. This is a slow technique, but can be expected to yield information on the effects of over-stimulation of the thyroid gland. This may have immediate practical application, if certain changes occur. (Author)
AD-651 128 HC$3.00 MF$0.65

STUDIES OF BINAURAL INTERACTION.
Tracor Inc Austin Tex
For primary bibliographic entry see Field 5J.
AD-651 145 HC$3.00 MF$0.65

SOME MECHANISMS FOR A THEORY OF THE RETICULAR FORMATION.
Final rept., 15 Nov 65-14 Nov 66,
Michigan State Univ East Lansing Div of Engineering Research
W. L. Kilmer, W. S. McCulloch, and J. Blum. Feb 67, 144p
AFOSR-67-0928
Contract AF 33 (615)-1747, Grant AF-AFOSR-1023-66
Research supported in part by NIH, Grant NIH-NB-04985-03, and NASA. Prepared in cooperation with Massachusetts Institute of Technology, Cambridge Instrumentation Lab.

Descriptors: (*Central nervous system, Models (Simulations)), Nervous system, Physiology, Anatomy, Nerve cells, Nerve impulses, Electrophysiology, Mathematical models, Bionics, Theory, Computer logic.

Throughout the life of the vertebrates, the core of the central nervous system, sometimes called the reticular formation, has retained the power to commit the whole animal to one mode of behavior rather than another. Its anatomy, or wiring diagram, is fairly well known, but to date no theory of its circuit action has been proposed that could possibly account for its known performance. Its basic structure is that of a string of similar modules, wide but shallow in computation everywhere, and connected not merely from module to adjacent module, but by long jumpers between distant modules. Analysis of its circuit actions heretofore proposed in terms of finite automata or coupled nonlinear oscillators has failed. A radical set of nonlinear, probabilistic hybrid computer concepts is proposed as a guideline for specifying the operational schemata of the above modules. Using the smallest numbers and greatest simplifications possible, a reticular formation concept consisting of 12 anastomatically-coupled modules stacked in columnar array was arrived at. A simulation test of its behavior shows that despite its 800-line complexity, it still behaves as an integral unit, rolling over from stable mode to stable mode according to abductive logical principles, and as directed by its succession of input 60-tuples. The concept employs the following design strategies: modular focusing of input information; modular decoupling under input changes; modular redundancy of potential command (modules having the most information have the most authority); and recruitment and inhibition around reverberatory loops. (Author)
AD-651 207 HC$3.00 MF$0.65

NEUROSCIENCES RESEARCH PROGRAM BULLETIN, VOLUME 4 SUPPLEMENT.
Neurosciences Research Program, Brookline, Mass.
15 Jul 66, 97p NASA-CR-83422
Grant NSG-462, Contract NIH-GM-10211-04

Descriptors: *Brain injury, *Hysteresis, *Macromolecule, *Memory, *Neuroscience, Bibliography, Change, Correlation, Cybernetics, Human, Lesion, Psychology, Readout, Storage.

For abstract, see STAR 05 11.
N67-22581 HC$3.00 MF$0.65

COMPARATIVE NEUROPHYSIOLOGY OF VISION FINAL SCIENTIFIC REPORT, SEP. 15, 1965 - SEP. 14, 1966.
Pisa Univ. (Italy). Inst. of Physiology.
G. Moruzzi. 15 Sep 66, 13p AFOSR-66-2764, AD-643497
Contract AF-EOAR-61-/052/-830

Descriptors: *Neurophysiology, *Vision, Comparison, Electrophysiology, Inhibition, Insect, Nervous, Neuron, Photoreceptor, Retina, Stimulation, System.

For abstract, see STAR 05 11.
N67-23050 HC$3.00 MF$0.65

ETUDES STATISTIQUES RELATIVES A L'EXPLORATION FONCTIONNELLE DE LA GLANDE THYROIDE CHEZ DES RATS AYANT SUBI UNE SECTION MEDULLAIRE HAUTE (Statistical Studies Relative to the Functional Exploration of Thyroid Gland in Rats Having Undergone a Spinal Section at High Level).
Commissariat a l'Energie Atomique, Grenoble (France). Centre d'Etudes Nucleaires.
Sylvain Caine, Claudine Agnius-Delord, Renaud Rinaldi, and Maurice Tanche. Apr 67, 30p CEA-R-3217
Text in French; Attached summary in English.

Descriptors: (*Thyroid gland, Tracer studies), Biometry, Analysis of variance, Thyroxine, Injection (Medicine), Tables, Rats.

The simultaneous study of qualitative influences of many factors of variability is a statistical problem which is strictly solved by analysis of variance. However the biological problem which is set here will be pretext not only for the use of technical variance analysis with repetitions, but also for realizing, on the one hand preliminary tests employing this method in particular the normality test the program of which was realized on a CAB 500, and on the other hand from the SCHEFFE'S method allowing to direct the use in the interpretation of significant interactions exposed by analysis of variance. It is well known that these interactions when they exist in a too great number, are for the most part stated without being explained. (Author)
PB-174 566 HC$3.00 MF$0.65

6Q. PROTECTIVE EQUIPMENT

LUNAR SAMPLE RECEIVING LABORATORY GLOVE SYSTEM INTERIM MONTHLY PROGRESS REPORT, OCT. 1966 - JAN. 1967.
Litton Systems, Inc., Beverly Hills, Calif. Space Sciences Labs.
For primary bibliographic entry see Field 6B.
For abstract, see STAR 05 11.
N67-23327 HC$3.00 MF$0.65

6R. RADIOBIOLOGY

RESISTANCE OF LONG-LIVED LYMPHOCYTES AND PLASMA CELLS IN RAT LYMPH NODES TO TREATMENT WITH PREDNISONE, CYCLOPHOSPHAMIDE, 6 MERCAPTOPURINE, AND ACTINOMYCIN D,
Naval Radiological Defense Lab San Francisco Calif
For primary bibliographic entry see Field 6O.
AD-650 863 HC$3.00 MF$0.65

THE WHOLESOMENESS OF IRRADIATED FOODS,
Army Medical Research and Nutrition Lab Denver Colo
For primary bibliographic entry see Field 6H.
AD-651 020 Not available from CFSTI.

THE ACUTE MORTALITY RESPONSE OF MONKEYS (MACACA MULATTA) TO MIXED GAMMA-NEUTRON RADIATIONS AND 250 KVP X RAYS,
Special publication,
Armed Forces Radiobiology Research Inst Bethesda Md
Richard E. Stanley, Leslie J. Seigneur, and Thomas A. Strike. Dec 66, 15p Rept no. AFRRI-SP66-23
Prepared for presentation at the International Congress of Radiation Research (3rd), Cortina, Italy, 26 June-2 July 1966.

Descriptors: (*Mortality rates, *Radiation effects), Gamma rays, Neutrons, X rays, Radiological dosage, Whole body irradiation, Lethal dosage, Hemopoietic system, Radiation injuries, Monkeys.

One hundred and forty young adult male and female monkeys (Macaca mulatta) were irradiated with single whole-body doses of mixed gamma-neutron radiations or 250 kVp x rays. The 80 mixed gamma-neutron and 60 x irradiated animals were uniformly exposed in groups of 10 to graded doses delivered at the rate of 16 and 20 rads per minute respectively while being slowly rotated in an upright position. Referenced to the midline of a Plexiglas monkey phantom, LD 50/60 values of 503 plus or minus 20 rads and 381 plus or minus 13.5 rads were calculated for x-ray and mixed gamma-neutron radiations, respectively. Using 250 kVp x ray as the reference source, the acute mortality Relative Biological Effectiveness of mixed gamma-neutron radiations as determined by the ratio of midline rad doses in a Plexiglas phantom was 1.3. Ninety-three percent of the deaths occurred in the 10 - 19-day interval resulting in a mean survival time of approximately 15 days with no deaths occurring after 28 days. From the comparative data on clinical observations, survival time, gross pathology of the decedents and serial hemograms of the survivors during the 30 - 60-day intervals, no significant difference in response was apparent in the x- or mixed gamma-neutron irradiated monkey. Further, death, with one exception, was concluded to be principally attributable to hematopoietic injury with infection as the major contributing lethal factor. (Author)
AD-651 055 HC$3.00 MF$0.65

PATHOLOGICAL EFFECTS OF THYROID IRRADIATION.
Revised ed.
Federal Radiation Council Washington Dc
Dec 66, 13p
Revision of manuscript submitted Jul 1962.

Descriptors: (*Thyroid gland, *Radiation effects), Pathology, Radioactive isotopes, Iodine, Radiological dosage, Metabolism, Cancer, X rays, Diagnostic agents, Radiotherapy, Reactor accidents, Children, Radioactive fallout, Marshall Islands, Population, Nuclear warfare casualties, Radiation injuries.

Therapeutic doses of X-rays to the thyroid region of children have been followed after some years by the development of thyroid neoplasms. Whereas the percent of cases of malignant neoplasms is small, the proportion of persons irradiated who develop nodular thyroid disease can be extremely high. The incidence of radiation-induced thyroid disease is strongly dose dependent above 100 rads (thyroid dose). The shape of the response curve below 100 rads is unknown. X-rays are probably as effective if not more so than iodine 131 in producing thyroid lesions for equal, average absorbed doses delivered to the gland at similar rates. An apparent greater effectiveness of X-ray irradiation may be due to the higher dose rate used. Whereas it was formerly believed that the induction of thyroid tumors was enhanced by irradiation of tissues other than the thyroid itself, it now seems possible to explain variability in tumor induction in children on the basis of whether or not the gland was in the

primary X-ray beam. Radioactive iodine in amounts sufficient to deliver several hundred rads to the thyroid of the infant or young child has been shown to produce a high incidence of thyroid nodules. Radioactive iodine has been shown to be carcinogenic in some animals. No case of thyroid cancer clearly ascribable to it has been reported in man. (Author)
AD-651 181 HC$3.00 MF$0.65

PLUTONIUM ABSTRACTS. VOLUME 6, NUMBER 11.
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
For primary bibliographic entry see Field 7D.
For abstract, see NSA 21 09.
BNWL-113-23 HC$3.00 MF$0.65

PACIFIC NORTHWEST LABORATORY ANNUAL REPORT FOR 1965 IN THE BIOLOGICAL SCIENCES,
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
R. C. Thompson, and E. G. Swezea. Jan 66, 150p
Contract AT (45-1)-1830

Descriptors: (*Radiation effects, Toxicity) (*Aquatic animals, Radiation effects), Environment, Ecology, Radiation hazards, Radioactive isotopes.

For abstract, see NSA 21 09.
BNWL-280 HC$3.00 MF$0.65

ISODOSES OF THE CS RADIATION EQUIPMENT OF THE KFA JUELICH (PROBLEM OF THE DEEP RAY THERAPY).
Isodosen Der Cs-bestrahlungsanlage Der Kfa Juelich (Probleme Der Tiefenstrahlentherapie)
Kernforschungsanlage, Juelich (West Germany). Zentralabteilung Strahlenschutz.
K. Kasperek, and H. G. Schnippering. Sep 64, 38p JUL-194-ST
in German

Descriptors: *Cesium, *Radiation therapy, *Radioactive isotope, Beam, Diagnosis, Dosage, Equipment, Facility, Focus, Isotope, Medicine, Radiation, Radioactivity, Radiology, Shielding, Therapy, Tissue, Treatment, Tube.

For abstract, see STAR 05 11.
N67-23029 HC$3.00 MF$0.65

EQUIPMENT FOR LOCAL IRRADIATION OF TRANSPLANTED MOUSE TUMORS WITH THERMAL NEUTRONS IN REACTOR FRJ-1.
Ein Einrichtung Zur Oertlichen Bestrahlung Von Transplantierten Maeusetumoren Mit Thermischen Neutronen Am Reaktor Frj-1
Kernforschungsanlage, Juelich (West Germany). Inst. Fuer Medizin.
W. Porschen. Feb 66, 38p JUL-356-ME
in German

Descriptors: *Animal study, *Radiation therapy, *Research facility, *Tumor, Animal, Equipment, Facility, Flux, Irradiation, Medicine, Mouse, Neutron, Nuclear, Radiation, Reactor, Research, Small, Study, Therapy, Thermal, Treatment.

For abstract, see STAR 05 11.
N67-23033 HC$3.00 MF$0.65

THE ROLE OF NUCLEOTIDE METABOLISM IN THE REPAIR OF RADIATION INJURY SEMI-ANNUAL PROGRESS REPORT, 1 OCT. 1966 - 1 APR. 1967.
Arkansas Univ., Little Rock.
1 Apr 67, 8p NASA-CR-83540
Contract NGR-04-001-014

Descriptors: *Metabolism, *Nucleotide, *Radiation effect, Adenosine triphosphate (atp), Cell, Cobalt 60, Effect, Gamma, Radiation, Respiration, Survival, Synthesis.

For abstract, see STAR 05 11.
N67-23267 HC$3.00 MF$0.65

RADIATION MONITORING WITH NUCLEAR EMULSIONS ON PROJECT GEMINI. II. RESULTS ON THE 14-DAY MISSION GEMINI VII.
Naval School of Aviation Medicine, Pensacola, Fla.
H. J. Schaefer, and J. J. Sullivan. 11 Jan 67, 16p
NASA-CR-83543, NAMI-990
Prepared Jointly With Nasa

Descriptors: *Gemini project, *Nuclear emulsion, *Radiation detector, Astronaut, Detector, Dosimetry, Emulsion, Energy, Environment, Hazard, Monitor, Nuclear, Proton, Radiation, Space flight, Testing, Tissue.

For abstract, see STAR 05 11.
N67-23270 HC$3.00 MF$0.65

COMPILATION OF UNITED STATES NUCLEAR STANDARDS. 3RD EDITION, 1966.
Oak Ridge National Lab., Tenn.
Dec 66, 111p
Contract W-7405-eng-26

Descriptors: (*Reactor safety systems, Standards), (*Reactor system components, *Safety devices), Nuclear physics, Nuclear engineering.

For abstract, see NSA 21 09.
ORNL-NSIC-30 HC$3.00 MF$0.65

METABOLISME DU 137CESIUM, 137BARYUM CHEZ LE RAT THERAPEUTIQUE DE LA CONTAMINATION (Metabolism of 137Cesium, 137Barium in the Rat. Therapeutics of the Contamination),
Commissariat a l'Energie Atomique, Fontenay-Aux-Roses (France). Centre d'Etudes Nucleaires.
Jacques Remy, Alain Philippon, and Jacques Lafuma. Feb 67, 63p CEA-R-3108
Text in French; attached summary in English.

Descriptors: (*Radioactive isotopes, Metabolism), Excretion, Strontium, Barium, Radiological dosage, Reaction kinetics, Ions, In vivo analysis, In vitro analysis, Blood plasma, Erythrocytes, Transport properties, Membranes (Biology), Cells (Biology), Rats.

Research was conducted on the distribution kinetics, the metabolism and the excretion of 137Cs-137Ba in the rat. They show that these phenomena are independent of the method of applying a single dose. The distribution tends to adopt in all cases a typical shape which remains the same depending on the body burden. Biological analysis of the state of the cesium in the biological media shows that it is transported in the free and ionised form. Considering the problem of the method of penetration of the cesium ion in the intracellular medium, and in particular by the in vivo and in vitro kinetic study of the plasma-red cell system, the authors make the assumption that an active transport of cesium occurs by the celle membrane. They thus arrive at an overall picture of the cesium distribution in the organism which is essentially characterized by a dynamic distribution equilibrium between two compartments: 99 per cent of the cesium accumulates in the intracellular pool, 1 per cent in the extracellular liquids. (Author)
PB-174 563 HC$3.00 MF$0.65

SOLUBILIZATION METHOD FOR CENTIGRAM TO KILO-GRAM PLANT SAMPLES,
California Univ., Los Angeles. Lab. of Nuclear Medicine and Radiation Biology.
R. A. Wood, S. T. Wakakuwa, and T. H. Rutherford. Jan 67, 11p
Contract AT (04-1)-GEN-12

Descriptors: (*Plants (Botany), *Radiobiology), (*Radiochemistry, Organic materials), Solubility, Drying.

For abstract, see NSA 21 09.
UCLA-12-613 HC$3.00 MF$0.65

AVAILABLE DISINTEGRATION ENERGY OF ALL RADIONUCLIDES (FOR USE IN DOSIMETRY PROBLEMS). I. HALF-LIVES 12 HOURS OR GREATER,
California Univ., Livermore. Lawrence Radiation Lab.
C. Ann Burton, and Joan H. Maxwell. 15 Dec 66, 34p
Contract W-7405-eng-48

Descriptors: (*Dosimeters, *Half life), (*Health physics instrumentation, Computer programs).

For abstract, see NSA 21 09.
UCRL-50164 HC$3.00 MF$0.65

STUDY ON INTERNATIONAL TRAFFIC OF RADIOACTIVE MATERIALS.
Final rept.
Southern Interstate Nuclear Board, Atlanta, Ga.
17 Jul 66, 271p
Contract AT (49-14)-2808

Descriptors: (*Radioactive isotopes, Transportation), Railroads, Air, Water, Bridges, Traffic, Containers, Economics.

For abstract, see NSA 21 09.
WASH-2808 HC$3.00 MF$0.65

6S. STRESS PHYSIOLOGY

FURTHER DEVELOPMENT OF THE BIOTHERMAL ANALOG COMPUTER.
Washington Univ Seattle Dept of Physiology and Biophysics
For primary bibliographic entry see Field 6B.
AD-650 729 HC$3.00 MF$0.65

ALTERATIONS IN BODY COMPOSITION IN MAN AFTER ACUTE EXPOSURE TO HIGH ALTITUDE,
Army Medical Research and Nutrition Lab Denver Colo
Martin I. Surks, Kenneth S. K. Chinn, and Le Roy O. Matoush. 8 Apr 66, 6p
Availability: Published in Journal of Applied Physiology v21 n6 p1741-6 Nov 1966.

Descriptors: (*Body weight, High altitude), Blood volume, Body fluids, Potassium, Excretion, Density, Water, Hypoxia.
Identifiers: Creatinine.

Body composition was measured in five young males, residents of Denver, Colorado (5,280 ft altitude) before, during, and after 8 days on the summit of Pikes Peak, Colorado (14,100 ft altitude). Body weight progressively decreased during the altitude period resulting primarily from a decrease in body fat as estimated by measurements of body density, creatinine excretion, and total body potassium (K) (from K40 counting). No changes were observed in total body water (W), lean body mass, protoplasmic mass (M3), and bone mineral, all of which were derived from the same measurements. Although M3 was unchanged, calculations based on creatinine excretion and K showed an increase in nonmuscle protein at the expense of muscle protein. Attempts to measure W directly, employing deuterium oxide dilution, were unsuccessful possi-

bly due to uneven distribution of this isotope in the body water compartments at high altitude. A highly significant decrease ($P < 0.001$) in plasma volume after 4 and 8 days at altitude provided direct evidence for altered water distribution in this environment. (Author)
AD-651 011 Not available from CFSTI.

CENTRIFUGATION OF THE WHITE-FRONTED CAPUCHIN MONKEY, CEBUS ALBIFRONS (HUMBOLDT).
Joint rept.,
Naval Aerospace Medical Inst Pensacola Fla
James C. Knepton, Jr. Dec 66, 15p Rept no. NAMI-997
NAVMED-MR005.04-0032-3

Descriptors: (*Acceleration tolerance, *Monkeys), Space medicine, Electrocardiography, Body temperature, Respiration, Centrifuges.

In preparation for biological experiments aboard orbiting laboratories three Cebus albifrons, white-fronted capuchin monkey, were exposed to five headward-directed (+Az) resultant linear acceleration stimuli aboard a centrifuge and their ECG's, skin temperatures, and breathing rates recorded. Marked tachycardia was noted at the start of the centrifugation, followed by bradycardia within 6 to 7 minutes at 7.5 g and within 1 1/2 minutes at 10.3 g. Concomitant with the onset of bradycardia, a loud squeal was usually heard. There were no significent temperature changes, and breathing rates did not vary from normal. Normal heart rate was restored upon cessation of centrifugation. It appears that the Cebus can withstand the acceleration of space travel and therefore will be a good experimental animal in that environment. (Author)
AD-651 067 HC$3.00 MF$0.65

PROCEEDINGS OF THE FIRST CONFERENCE ON VESTIBULAR PHYSIOLOGY AND SPATIAL DISORIENTATION, SCHOOL OF AVIATION MEDICINE, USAF, 24-25 JUNE 1958.
School of Aviation Medicine Randolph AFB Tex
25 Jun 58, 98p

Descriptors: (*Vestibular apparatus, Physiology), (*Aviation medicine, Symposia), Motion sickness, Proprioception, Semicircular canals, Visual perception, Vertigo, Nystagmus, Equilibrium, Pilots, Aviation accidents, Acceleration, Nerves, Adaptation (Physiology), Responses.

Contents: Indicated Problems and Reasons for Conference: Clinical Problems; Spatial Disorientation; Approaches to Research in Basic Vestibular Physiology, Neuro-Anatomy and Neurophysiology; Film Showing Results of Utricular Nerve Section; Approaches to Assessment of Vestibular Sensitivity (F ctions); Basic Visual and Perceptive Mechanisms; Rotating Device; Research in Spatial Disorientation: Present Approaches; Recommended Approaches for Research in Spatial Disorientation.
AD-651 150 HC$3.00 MF$0.65

BIO-THERMAL RESPONSES TO VARIED WORK PROGRAMS IN MEN KEPT THERMALLY NEUTRAL BY WATER COOLED CLOTHING.
Webb Associates, Yellow Springs, Ohio.
J. A. Annis, and P. Webb. Apr 67, 70p NASA-CR-739
Contract NASW-1306

Descriptors: *Physiological response, *Protective clothing, *Task complexity, Clothing, Complexity, Cooling, Extravehicular operation, Human engineering, Physiology, Protection, Response, Task, Thermal, Water, Work capacity.

For abstract, see STAR 05 11.
N67-22151 HC$3.00 MF$0.65

STUDIES OF THE EFFECTS OF ACCELERATION ON CARDIOVASCULAR AND RESPIRATORY DYNAMICS SEMIANNUAL STATUS REPORT.
Mayo Clinic, Rochester, Minn.
J. H. Reed, Jr., and E. H. Wood. 1 Apr 67, 25p NASA-CR-83323
Grant NSG-327

Descriptors: *Acceleration tolerance, *Blood flow, *Dog, *Human, *Pulmonary circulation, Acceleration, Animal, Circulation, Lung, Perfusion, Physiology, Pulmonary, Response, Study, Tolerance, Ventilation.

For abstract, see STAR 05 11.
N67-22356 HC$3.00 MF$0.65

AEROSPACE MEDICINE AND BIOLOGY - A CONTINUING BIBLIOGRAPHY, FEBRUARY, 1967.
National Aeronautics and Space Administration, Washington, D. C.
Mar 67, 48p NASA-SP-7011/35/

Descriptors: *Abstract, *Aerospace medicine, *Bibliography, *Biology, Aerospace, Environment, Life, Medicine, Pharmacology, Physiology, Sanitation, Simulation, Space flight, Support, Survival, Toxicology.

For abstract, see STAR 05 11.
N67-22885 HC$3.00 MF$0.65

AEROSPACE MEDICINE AND BIOLOGY - A CONTINUING BIBLIOGRAPHY, 1966.
National Aeronautics and Space Administration, Washington, D. C.
Jan 67, 929p NASA-SP-7011/33/

Descriptors: *Aerospace medicine, *Bibliography, *Biology, Aerospace, Author, Index, Medicine, Nasa program, Source, Subject.

For abstract, see STAR 05 11.
N67-22896 HC$3.00 MF$0.65

SOUNDPRESSURE MEASUREMENTS ONBOARD WARSHIPS, I.
Geluidmetingen Aan Boord Van Marine Schepen
Institute for Perception RVO-TNO, Soesterberg (Netherlands).
T. Houtgast, and H. J. Steeneken. 1966, 23p IZF-1966-19, TDCK-47147
in Dutch, English Summary

Descriptors: *Noise tolerance, *Ship, *Sound intensity, Communication, Damage, Intensity, Interference, Level, Measurement, Noise, Personnel, Sound, Spectrum, Station, Tolerance, Variation, Voice.

For abstract, see STAR 05 11.
N67-23074 HC$3.00 MF$0.65

THE EGOCENTRIC LOCALIZATION OF THE VISUAL HORIZONTAL IN NORMAL AND LABYRINTHINE- DEFECTIVE OBSERVERS AS A FUNCTION OF HEAD AND BODY TILT.
Naval School of Aviation Medicine, Pensacola, Fla. Aerospace Medical Inst.
B. Clark, and A. Graybiel. 17 Jan 67, 11p NASA-CR-83525, NAMI-991
NASA ORDER R-93
Joint Rept. With Nasa

Descriptors: *Kinesthesis, *Labyrinth, *Vestibular effect, *Visual perception, Apparatus, Body, Defect, Effect, Error, Eye, Head, Horizontal, Localization, Perception, Position, Tilt, Vestibular, Visual.

For abstract, see STAR 05 11.
N67-23251 HC$3.00 MF$0.65

THE INFLUENCE OF ALTITUDE ON THE ANAEROBIC AND AEROBIC CAPACITIES OF MEN IN WORK FINAL SCIENTIFIC REPORT.
Indiana Univ., Bloomington. Dept. of Anatomy and Physiology.
C. Dawson, K. Klausen, E. D. Michael, L. G. Myhre, and J. L. Newton. 31 Dec 66, 15p
NASA-CR-83526
Grant NSG-408

Descriptors: *Altitude test, *Human performance, *Oxygen breathing, *Work capacity, Aerobe, Altitude, Anaerobe, Anoxia, Breathing, Capacity, Exhaustion, Heart, High altitude, Human, Oxygen, Performance, Physical, Rate, Respiration, Test, Work.

For abstract, see STAR 05 11.
N67-23252 HC$3.00 MF$0.65

DISTRIBUTION OF LACTIC ACID BETWEEN PLASMA AND RED CELLS DURING WORK AND RECOVERY.
Indiana Univ., Bloomington. Dept. of Anatomy and Physiology.
J. L. Newton, and S. Robinson. 31 Dec 66, 9p
NASA-CR-83529
Grant NSG-408

Descriptors: *Blood plasma, *Hemoglobin, *Lactic acid, *Work-rest cycle, Acid, Blood, Cell, Concentration, Cycle, Diffusion, Exhaustion, Lactate, Lactic, Physical, Physiology, Plasma, Recovery, Red, Rest, Work.

For abstract, see STAR 05 11.
N67-23255 HC$3.00 MF$0.65

KINEMATICS NOMENCLATURE FOR PHYSIOLOGICAL ACCELERATIONS WITH SPECIAL REFERENCE TO VESTIBULAR APPLICATIONS.
Naval School of Aviation Medicine, Pensacola, Fla.
M. J. Correia, W. C. Hixson, and J. I. Niven. 8 Aug 66, 98p NASA-CR-83568
NASA ORDER R-93
Its Monograph 14

Descriptors: *Kinematics, *Physiological acceleration, *Vestibular apparatus, Acceleration, Aerospace medicine, Apparatus, Centrifuge, Coriolis effect, Nomenclature, Physiology, Vestibular.

For abstract, see STAR 05 11.
N67-23331 HC$3.00 MF$0.65

6T. TOXICOLOGY

HAZARDS OF CARBON TETRACHLORIDE FIRE EXTINGUISHERS.
Federal Fire Council Washington D C
For primary bibliographic entry see Field 13L.
AD-650 674 HC$3.00 MF$0.65

CASE HISTORIES OF DEATHS AND INJURIES FROM CARBON TETRACHLORIDE FIRE EXTINGUISHERS,
Federal Fire Council Washington D C
For primary bibliographic entry see Field 13L.
AD-650 734 HC$3.00 MF$0.65

AN ANNOTATED BIBLIOGRAPHY ON CARBON TETRACHLORIDE AS A FIRE EXTINGUISHANT,
Federal Fire Council Washington D C
For primary bibliographic entry see Field 13L.
AD-650 735 HC$3.00 MF$0.65

ELECTROPHYSIOLOGICAL STUDY OF NEUROMUSCULAR BLOCKING ACTION OF COBRA NEUROTOXIN,
National Taiwan Univ Taipei Pharmacological Inst
C. C. Chang, and C. Y. Lee. 7 Jun 66, 11p
Grant DA-MD-49-193-64-G108
Availability: Published in British Journal of Pharmacology and Chemotherapy v28 n2 p172-81 Nov 1966.

Descriptors: (*Skeletal muscle relaxants, Venoms), (*Venoms, Electrophysiology), Neuromuscular transmission, Nerves, Muscles, Paralysis, Curare alkaloids, Parasympathomimetic agents, Toxins + antitoxins, Toxicity, Pharmacology, Reptiles, Taiwan.

The effect of purified neurotoxin from Formosan cobra (Naja naja atra) venom on neuromuscular transmission was studied electrophysiologically in the rat phrenic nerve-diaphragm and frog sciatic-sartorius preparations. While end-plate potentials were depressed markedly by the neurotoxin, no effect was found on the terminal nerve spikes, action potentials of muscles, and resting membrane potentials. The spontaneous miniature end-plate potentials were diminished rapidly before transmission block occurred. End-plate potentials of the neurotoxin-paralysed muscle showed a shorter time-course than those obtained in the muscle treated with dimethyl-tubocurarine. The former were increased in their size and prolonged in their time-course by neostigmine as were the latter. Antidromic activities in the phrenic nerve in the presence of neostigmine were abolished by the neurotoxin as well as by d-tubocurarine. The amplitude of successive end-plate potentials on repetitive stimulation declined markedly as in the curarized muscle. A component which depolarizes the muscle was found in the cardiotoxic fraction. The terminal nerve spike was abolished by this fraction. It is concluded that cobra neurotoxin acts both post- and pre-synaptically just as d-tubocurarine does. (Author)
AD-650 774 Not available from CFSTI.

DISTRIBUTION OF BUNGARUS MULTICINCTUS VENOM FOLLOWING ENVENOMATION,
National Taiwan Univ Taipei Pharmacological Inst
C. Y. Lee, and L. F. Tseng. 25 Sep 65, 12p
Grant DA-MD-49-193-64-G108
Research supported in part by National Council on Science Development, Republic of China.
Availability: Published in Toxicon v3 p281-90 1966.

Descriptors: (*Venoms, Tracer studies), Biological assay, Labeled substances, Radioactive isotopes, Cerebrospinal fluid, Injection (Medicine), Toxins + antitoxins, Paralysis, Respiratory system, Tissues (Biology), Rabbits, Reptiles, Taiwan.

The distribution of the venom of Bungarus multicinctus and its purified toxins (alpha- and beta-Bungarotoxin) in animals has been studied either by bioassay method or using 1131-labeled preparations. Although radioactivity could be detected in the cerebrospinal fluid (CSF) of rabbits after intravenous injection of 1 mg per kg of the venom or the toxins, the CSF levels were too low to account for the rapid respiratory paralysis. No measurable amounts of the venom were found in the CSF by the bioassay method at this dose level. The highest radioactivity was found in kidneys, followed in decreasing order by lungs, spleen, heart, stomach, intestine, diaphragm and skeletal muscle, with the lowest in the brain. In mice, injected subcutaneously with 2 LD50 of the venom or the Bungarotoxins, similar distribution patterns were found, except for much higher radioactivity in the stomach. Alpha-Bungarotoxin was found to localize on the end-plate zone of the mouse diaphragm, whereas beta-Bungarotoxin did not show such localization. (Author)
AD-650 775 Not available from CFSTI.

METHYL ALCOHOL POISONING,
Maryland Univ Baltimore Clinical Shock Unit
For primary bibliographic entry see Field 6E.
AD-650 784 Not available from CFSTI.

THE ENHANCEMENT OF PENETRATION OF AN ORGANOPHOSPHORUS ANTICHOLINESTERASE THROUGH GUINEA PIG SKIN BY DIMETHYL SULFOXIDE,
Defence Chemical Biological and Radiation Labs Ottawa (Ontario)
H. L. McDermot, A. J. Finkbeiner, W. J. Wills, and R. M. Heggie. 11 Oct 66, 7p Rept no. DCBRL-TN-67-2
Availability: Published in Canadian Journal of Physiology and Pharmacology.

Descriptors: (*Soman, Penetration), (*Cholinesterase inhibitors, Penetration), Sulfoxides, Skin, Guinea pigs, Toxicity, Organic phosphorus compounds, Canada.
Identifiers: Dimethyl sulfoxide.

The penetration of both intact and stripped guinea pig skin by soman was enchanced by dimethyl sulfoxide (DMSO), showing that DMSO does not act solely by increasing the penetration of stratum corneum. At high concentrations of DMSO the increase in penetration was masked by a decrease in the spreading of the mixtures on skin, but when this decrease was taken into consideration the penetration rate of soman increased with increasing DMSO concentrations up to at least 90%. (Author)
AD-650 797 Not available from CFSTI.

7. CHEMISTRY

7A. CHEMICAL ENGINEERING

FUEL CELL FUEL STUDIES.
Esso Research and Engineering Co Linden N J Government Research Lab
For primary bibliographic entry see Field 10B.
AD-650 580 HC$3.00 MF$0.65

RESEARCH STUDIES ON SOLID HYDROGEN PURIFICATION MEMBRANES.
Interim technical rept. no. 2, 15 May-15 Nov 66, Tyco Labs Inc Waltham Mass
D. Jewett, and A. C. Makrides. Mar 67, 44p
Contract DA-44-009-AMC-1183 (T)
See also AD-634 547.

Descriptors: (*Solidified gases, Purification), (*Hydrogen, Purification), (*Membranes, *Tantalum), Palladium, Metal films, Catalysis, Permeability, Recrystallization, Adsorption, Diffusion, Impurities, Interfaces, Microstructure.

The permeation rate of hydrogen through tantalum coated with a thin film of palladium was measured over the temperature range 400-600C and at pressures up to 175 psia. The permeation rate is substantially greater than that through pure palladium membranes of the same thickness under the same conditions. The permeation rate through tantalum decays with time, particularly at temperatures 500C or higher. An extensive study of the decay of the permeation rate in relation to the conditions of preparation of the membrane and the conditions of its use was carried out. It appears that at high temperatures extensive recrystallization of the palladium film takes place. This process probably leads to exposure of tantalum to the gas phase and causes a decrease of the rate of hydrogen absorption. Although this process is probably mainly responsible for the loss of activity, there also appears to be a secondary effect contributing to the decrease of the permeation rate arising either from diffusion of palladium into tantalum or from diffusion of an impurity, e.g. interstitially dissolved oxygen, from the bulk of the tantalum membrane to the tantalum-palladium interface. (Author)
AD-650 986 HC$3.00 MF$0.65

PLUTONIUM ABSTRACTS. VOLUME 6, NUMBER 11.
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
For primary bibliographic entry see Field 7D.
For abstract, see NSA 21 09.
BNWL-113-23 HC$3.00 MF$0.65

LABORATORY DEVELOPMENT OF THE GRIND-LEACH PROCESS FOR THE H.T.G.C.R. FUEL CYCLE. PART 2. DISSOLUTION OF BERYLLIA IN NITRIC ACID SOLUTIONS.
Atomic Energy Commission Research Establishment, Lucas Heights (Australia).
M. S. Farrell, S. R. Isaacs, and M. E. Shying. Jun 66, 28p AAEC-E-154

Descriptors: *Beryllium oxide, *Grinding, *Leaching, *Nitric acid, Acid, Aluminum, Beryllium, Dissolution, Fluoride, Fuel, Irradiation, Metal, Neutron, Nitric, Oxide, Powder, Processing, Solution.

For abstract, see STAR 05 11.
N67-23206 HC$3.00 MF$0.65

PROCEDE CONTINU DE PRECIPITATION DES SELS DE PLUTONIUM (Continuous Precipitation Process of Plutonium Salts),
Commissariat a l'Energie Atomique, Fontenay-Aux-Roses (France). Centre d'Etudes Nucleaires.
For primary bibliographic entry see Field 7E.
PB-174 576 HC$3.00 MF$0.65

PHYSICAL PROPERTIES OF FUSED SALT MIXTURES EUTECTIC COMPOSITIONS AND MELTING POINTS. DATA FROM OPEN LITERATURE, 1963-JUNE 30, 1965. VOLUME 2,
Sandia Corp., Albuquerque, N. Mex.
For primary bibliographic entry see Field 7D.
For abstract, see NSA 21 09.
SC-R-65-930-Vol-2 HC$3.00 MF$0.65

7B. INORGANIC CHEMISTRY

HYDRAZOIC ACID AND THE METAL AZIDES (A LITERATURE SURVEY),
Army Engineer Research and Development Labs. Fort Belvoir, Va.
Hyman Rosenwasser, and Franklin E. Wawner, Jr. 20 Jun 61, 39p AERDL-1551-TR-Suppl-2
See also PB-144 106, PB-144 106-S-1.

Descriptors: (*Azides, Reviews), (*Nitrogen compounds, Reviews), (*Explosive materials, Reviews), Ions, Free radicals, Chemical reactions, Alkali metal compounds, Alkaline earth compounds, Photolysis, Lead compounds, Complex compounds, Microstructure, Organic nitrogen compounds, Bibliographies.
Identifiers: Hydrazoic acid.

The report is the second supplement to previous literature surveys on hydrazoic acid and the metal azides. The coverage includes some references to organic azides and to related nitrogen topics. (Author)
AD-268 586 HC$3.00

OPTICAL CONSTANTS OF GERMANIUM,
Michigan Univ., Ann Arbor. Inst. of Science and Technology.
For primary bibliographic entry see Field 20F.
AD-435 012 HC$3.00

HEATS OF FORMATION OF ALPHA-BERYLLIUM CHLORIDE AND ALPHA- AND BETA-BERYLLIUM NITRIDE,
Fulmer Research Inst Ltd Stoke Poges (England)
For primary bibliographic entry see Field 7D.
AD-650 651 Not available from CFSTI.

RELATIONSHIP BETWEEN THE STEP-WISE STABILITY CONSTANTS OF COORDINATION COMPOUNDS AND THE NUMBER OF LIGANDS (ORGANIC LIGANDS),
Foreign Technology Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 7D.
AD-650 798 HC$3.00 MF$0.65

SYSTEM DEVELOPMENT PLAN FOR A NATIONAL CHEMICAL INFORMATION SYSTEM.
Information Management Inc Burlington Mass
For primary bibliographic entry see Field 5B.
AD-650 900 HC$3.00 MF$0.65

SYSTEM PERFORMANCE SPECIFICATION FOR A NATIONAL CHEMICAL INFORMATION SYSTEM.
Information Management Inc Burlington Mass
For primary bibliographic entry see Field 5B.
AD-650 901 HC$3.00 MF$0.65

SOLUTION CHEMISTRY.
Royal Inst of Tech Stockholm (Sweden) Dept of Inorganic Chemistry
For primary bibliographic entry see Field 7D.
AD-651 118 HC$3.00 MF$0.65

INVESTIGATION OF ADHESION AND COHESION OF METALS IN ULTRAHIGH VACUUM.
National Research Corp., Cambridge, Mass.
For primary bibliographic entry see Field 11F.
N62-10571 HC$3.00 MF$0.65

INVESTIGATION OF THE PRODUCTION AND THERMAL STABILITY OF METAL CARBAMATES.
Untersuchungen Zur Darstellung Und Thermischen Stabilitaet Von Metallcarbamaten
Eidgenossische Technische Hochschule, Zurich (Switzerland).
A. Sommeraeuer. 1965, 78p REPT.-3778
in German

Descriptors: *Carbamide, *Metal compound, *Thermodynamic property, Aluminum, Calcium, Carbamate, Characterization, Chemistry, Compound, Copper, Gallium, Inorganic, Metal, Nickel, Preparation, Property, Thermal, Thermodynamic, Zinc.

For abstract, see STAR 05 11.
N67-22127 HC$3.00 MF$0.65

CARBAMATE AND DIMETHYLCARBAMATE FROM TRANSITION METALS.
Carbamate Und Dimethylcarbamate Von Uebergangsmetallen
Eidgenossische Technische Hochschule, Zurich (Switzerland).
J.-J. Salzmann. 1965, 131p REPT.-3783
in German

Descriptors: *Carbamide, *Inorganic chemistry, *Thermodynamic property, *Transition element, Carbamate, Chemistry, Chromium, Cobalt, Copper, Dimethyl, Element, Inorganic, Magnetic, Metal, Nickel, Property, Reaction, Spectroscopy, Stability, Structure, Thermal, Thermodynamic, Transition, Zinc.

For abstract, see STAR 05 11.
N67-22128 HC$3.00 MF$0.65

NEON - ITS PHYSICAL AND PHYSICAL-CHEMICAL PROPERTIES - A BIBLIOGRAPHY.
Neon Physikalische Und Physikalisch-chemische Eigenschaften - Eine Literaturzusammenstellung
Kernforschungsanlage, Juelich (West Germany). Zentralbibliothek.
H. Huertgen. Aug 65, 43p JUL-BIBL-10
in German

Descriptors: *Bibliography, *Chemical property, *Neon, *Physical property, Chemical, Liquid, Physical, Physiochemistry, Production, Property, Solid, Solubility, Thermodynamic, Transport.

For abstract, see STAR 05 11.
N67-22940 HC$3.00 MF$0.65

ISOTOPE EXCHANGE BETWEEN HYDROGEN AND LIQUID AMMONIA IN THE PRESENCE OF A HETEROGENEOUS CATALYST.
Isotopenaustausch Zwischen Wasserstoff Und Fluessigem Ammoniak in Gegenwart Heterogener Katalysatoren
Kernforschungsanlage, Juelich (West Germany). Institut Fuer Physikalische Chemie.
D. Blennemann, and R. Haul. Jan 62, 94p JUL-31-PC
in German

Descriptors: *Hydrogen, *Isotope, *Liquid ammonia, Amide, Ammonia, Carbon, Catalyst, Electrochemistry, Exchange, Heterogeneity, Liquid, Metal, Platinum, Potassium, Pressure, Saturation, Temperature, Vapor.

For abstract, see STAR 05 11.
N67-23026 HC$3.00 MF$0.65

EFFECT OF CERTAIN ADDITIVES ON THE THERMAL DECOMPOSITION OF AMMONIUM PERCHLORATE.
National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
V. V. Bulanova, A. A. Shidlovskiy, and L. F. Shmagin. 25 Jan 67, 13p NASA-TM-X-59483, RSIC-640
Center, 25 Jan. 1967 13 P Refs Transl. Into English From Izv. Vyssh. Ucheb. Zaved., Khim. I Khim. Tekhnol. (Moscow), No. 4, 1965 P 533-538
Jointly Supported By Army Missile Command

Descriptors: *Additive, *Ammonium perchlorate, *Thermal decomposition, Activation, Ammonium, Carbonate, Chemical, Chloride, Cobalt, Decomposition, Effect, Energy, Gravimetry, Manganese, Oxide, Perchlorate, Reaction, Thermal.

For abstract, see STAR 05 11.
N67-23401 HC$3.00 MF$0.65

ETUDE DES REACTIONS ClF3-UO2F2 ET ClO2F-UO2F2 (Study of the Reactions ClF3-UO2F2 and ClO2F-UO2F2),
Commissariat a l'Energie Atomique, Saclay (France). Centre d'Etudes Nucleaires.
Michel Luce, and Olivier Hartmanshenn. Mar 67, 32p CEA-U-3210
Text in French; Attached summary in English.

Descriptors: (*Chlorine compounds, Chemical reactions), (*Uranium compounds, Fluorination), (*Fluorides, Chemical reactions), (*Uranyl radicals, Chemical reactions), Oxides, Oxyfluorides, Reaction kinetics, Synthesis (Chemistry), France.
Identifiers: Chlorine trifluoride, Chloryl fluoride, Uranium hexafluoride, Uranyl fluoride.

The reaction between ClF3 and UO2F2 is explained in terms of two secondary reactions involving the interaction between ClF and ClO2F on UO2F2. The origin of the by-products is indicated (ClO3F, ClO2, HF). (Author)
PB-174 568 HC$3.00 MF$0.65

CLEANING AN IDEAL BERYLLIUM SURFACE,
Dow Chemical Co., Golden, Colo.
Rocky Flats Div.
R. O. Adams. 14 Feb 67, 14p
Contract AT (29-1)-1106

Descriptors: (*Beryllium, Surfaces), (*Cleaning, Beryllium), Single crystals, Sputtering, Electron diffraction analysis.

For abstract, see NSA 21 09.
RFP-879 HC$3.00 MF$0.65

7C. ORGANIC CHEMISTRY

HYDRAZOIC ACID AND THE METAL AZIDES (A LITERATURE SURVEY),
Army Engineer Research and Development Labs., Fort Belvoir, Va.
For primary bibliographic entry see Field 7B.
AD-268 586 HC$3.00

LADDER POLYQUINOXALINES,
Iowa Univ Iowa City Dept of Chemistry 1601
For primary bibliographic entry see Field 7D.
AD-650 707 Not available from CFSTI.

THE REACTION OF CHLORO-t-BUTYL HYDROPEROXIDE WITH BASE,
San Diego State Coll Calif Dept of Chemistry
W. H. Richardson, J. W. Peters, and W. P. Konopka. 27 Aug 66, 9p
AROD-5546:1
Grant DA-ARO (D)-31-124-G657
Availability: Published in Tetrahedron Letters, n45 p5531-5 1966.

Descriptors: (*Peroxides, Chemical reactions), (*Organic oxygen compounds, Chemical reactions), Chlorine compounds, Halogenated hydrocarbons, Bases (Chemistry), Sodium compounds, Hydroxides, Acetones, Formaldehyde, Synthesis (Chemistry), Reaction kinetics.
Identifiers: Chlorobutyl hydroperoxides.

The reaction of chloro-t-butyl hydroperoxide with base (sodium hydroxide) is investigated. Acetone and formaldehyde were formed. No gaseous products were observed, which excludes oxygen and isobutylene as possible products. The reaction is first-order in chloro-t-butyl hydroperoxide, and the indications are that the reaction is not free radical. (Author)
AD-650 709 Not available from CFSTI.

ARYLGLYOXYLONITRILE OXIME p-TOLUENESULFONATES AND RELATED N-HALIMINES. PREPARATION AND REARRANGEMENT,
Rohm and Haas Co Huntsville Ala Redstone Research Labs
Travis E. Stevens. 8 Aug 66, 4p
Contract DA-01-021-AMC-11536 (Z)
Availability: Published in Journal of Organic Chemistry v32 p670-3 Mar 1967.

Descriptors: (*Acetonitriles, Chemical properties), (*Oximes, Chemical properties), (*Sulfonates, Chemical properties), (*Imines, Chemical properties), Toluenes, Chlorine compounds, Fluorine compounds, Molecular isomerism, Synthesis (Chemistry), Chemical reactions.
Identifiers: Chlorimino phenyl acetonitriles, Fluorimino phenyl acetonitriles, Oxime tosylates, Oximino chlorophenyl acetonitriles, Oximino phenyl acetonitriles.

The syn and anti isomers of alpha-oximinophenyl- and p-chlorophenylacetonitrile and the corresponding oxime tosylates were characterized. The configuration of the oxime tosylate had no effect on the rearrangement and fragmentation of the tosylate. The preparation of related N-

chlor- and N-fluor-alpha-iminoarylacetonitriles is reported also. (Author)
AD-650 776 Not available from CFSTI.

LOW-TEMPERATURE FLUORINATION OF SCHIFF BASES,
Rohm and Haas Co Huntsville Ala Redstone Research Labs
Richard F. Merritt, and Frederic A. Johnson. 15 Aug 66, 4p
Contract DA-01-021-AMC-11536
Availability: Published in Journal of Organic Chemistry v32 p416-9 Feb 1967.

Descriptors: (*Organic nitrogen compounds, *Fluorination), (*Fluoroamines, Synthesis (Chemistry)), Fluorine, Addition reactions, Amines, Fluorine compounds, Decomposition, Amides, Nuclear magnetic resonance, Halogenated hydrocarbons.
Identifiers: Schiff's bases.

Controlled addition of elemental fluorine to the carbon-nitrogen double bond of benzilidenealkylamines provides a synthetic route to alpha, alpha-difluoro secondary fluoramines. Some properties and reactions of these fluoramines are discussed. (Author)
AD-650 777 Not available from CFSTI.

THE ALKYLATION OF DIFLOURAMINE WITH CARBONIUM IONS,
Rohm and Haas Co Huntsville Ala Redstone Research Labs
W. H. Graham, and J. P. Freeman. 25 Jun 66, 2p
Contract DA-01-021-ORD-5135
Availability: Published in Journal of the American Chemical Society v89 n3 p716-7 Feb 1 1967.

Descriptors: (*Fluoroamines, *Alkylation), Fluorine compounds, Amines, Synthesis (Chemistry), Spectra (Infrared), Nuclear magnetic resonance, Imides.
Identifiers: Fluorimide.

It was found that difluoramine can be alkylated by carbonium ions generated under a variety of conditions. Some indications of the scope of reaction conditions and of the compounds that were prepared by this method are: (C6H5)3CNF2, (C6H5)2CHNF2, C6H5CCl2NF2, (CH3)3CNF2, C2H5C (CH3)2NF2, CH (OCH3)2NF2, CH3C (OCH3)2NF2, and C5H5ONF2. The new compounds were characterized by elemental analyses, infrared spectra, and, most convincingly, by their unique nuclear magnetic resonance spectra.
AD-650 778 Not available from CFSTI.

ON THE NATURE OF THE GROUND STATE OF CYCLOBUTADIENE,
Texas Univ Austin Dept of Chemistry 4410
L. Watts, J. D. Fitzpatrick, and R. Pettit. 24 Nov 65, 2p
Grant NSF-GP-2333
Research supported in part by ARO (D).
Availability: Published in Journal of the American Chemical Society v88 p623-4 1966.

Descriptors: (*Cyclobutenes, Ground state), (*Molecular energy levels, Cyclobutenes), Butadienes, Stereochemistry, Molecular orbitals, Dienes, Chemical reactions, Polycyclic compounds, Complex compounds, Molecular isomerism, Chemical reactions.
Identifiers: Cyclobutadienes.

Evidence was previously presented that degradation of cyclobutadieneiron tricarbonyl with ceric ion at 0C occurs with liberation of cyclobutadiene (see AD-649 675). It is now reported that the liberated cyclobutadiene reacts both as a diene and as a dienophile in a stereospecific manner; this supports the theory that cyclobutadiene possesses a singlet electronic ground state and, by implication, therefore has the structure predicted by Roberts and Streitwieser (JACS v74 p4579 1952).
AD-650 782 Not available from CFSTI.

STEREOCHEMICAL ASPECTS OF THE DIELS-ALDER REACTION.
Revised ed.,
California Inst of Tech Pasadena Gates and Crellin Labs of Chemistry
Joseph B. Lambert, and John D. Roberts. 12 Mar 65, 8p Rept no. Contrib-3210
Grant NSF-GP-1953
Revision of manuscript submitted 17 Feb 65. Supported by NSF and ONR.
Availability: Published in Tetrahedron Letters n20 p1457-63 1965.

Descriptors: (*Diene synthesis, *Stereochemistry), Halogenated hydrocarbons, Cyclopentenes, Dienes, Styrenes, Deuterated compounds, Tracer studies, Nuclear magnetic resonance, Free radicals, Molecular isomerism, Chlorine compounds, Alkenes.
Identifiers: Hexachloro cyclopentadienes, Methyl styrenes.

In order to determine if a stabilized diradical intermediate is involved in the Diels-Alder reaction of hexachloro cyclopentadiene and alpha-methylstyrene, the stereochemical courte of this reaction was studied by the stereo-specific introduction of deuterium into the vinyl position of the styrene and subsequent examination of the location of labeling in the adduct by NMR spectroscopy. The resultant data do not confirm such a diradical mechanism; the high degree of specificity in this and similar reactions seems best accounted for on the basis of a one-step, concerted mechanism.
AD-650 825 Not available from CFSTI.

SYSTEM DEVELOPMENT PLAN FOR A NATIONAL CHEMICAL INFORMATION SYSTEM.
Information Management Inc Burlington Mass
For primary bibliographic entry see Field 5B.
AD-650 900 HC$3.00 MF$0.65

SYSTEM PERFORMANCE SPECIFICATION FOR A NATIONAL CHEMICAL INFORMATION SYSTEM.
Information Management Inc Burlington Mass
For primary bibliographic entry see Field 5B.
AD-650 901 HC$3.00 MF$0.65

ANION UNIPOLYMERIZATION OF CYCLOHEXADIENE-1,3.
Die Anionische Unipolymerisation Von Cyclohexadien-1,3
Eidgenossische Technische Hochschule, Zurich (Switzerland).
E. P. Y Montano. 1965, 69p REPT.-3742
rman

Descriptors: *Alkali metal, *Aromatic compound, *Cyclohexane, *Diene, *Polymer chemistry, Alkali, Anion, Aromatics, Chain, Chemistry, Compound, Concentration, Exchange, Formation, Hexadiene, Initiator, Metal, Monomer, Polymer, Ratio, Structure.

For abstract, see STAR 05 11.
N67-22099 HC$3.00 MF$0.65

RESEARCH AND DEVELOPMENT STUDY RELATED TO THE SYNTHESIS OF FORMALDEHYDE FROM CO2 AND H2 QUARTERLY PROGRESS REPORT, AUG. - OCT. 1966.
General American Transportation Corp., Niles, Ill. Research Div.
P. Budininkas, R. W. Ferris, and G. A. Remus.
Oct 66, 32p NASA-CR-73070-1, QPR-1
Contract NAS2-3889

Descriptors: *Bibliography, *Formaldehyde, *Space environment, *Synthesis, Carbon dioxide, Chemistry, Environment, Hydrogen, Methane, Oxidation, Space.

For abstract, see STAR 05 11.
N67-22173 HC$3.00 MF$0.65

RESEARCH AND DEVELOPMENT STUDY RELATED TO SYNTHESIS OF FORMALDEHYDE FROM CO2 AND H2 QUARTERLY PROGRESS REPORT, NOV. 1966 - JAN. 1967.
General American Transportation Corp., Niles, Ill. Research Div.
P. Budininkas, R. W. Ferris, and G. A. Remus.
Jan 67, 12p NASA-CR-73071-11, QPR-2
Contract NAS2-3889

Descriptors: *Catalyst, *Formaldehyde, *Methane, *Synthesis, Chemistry, Effect, Environment, Gas, Oxidation, Solid, Space, Temperature, Velocity.

For abstract, see STAR 05 11.
N67-22174 HC$3.00 MF$0.65

SYNTHESIS OF HIGHER ORDER HYDROCARBONS ON HOT TUNGSTEN FILAMENTS.
National Aeronautics and Space Administration, Goddard Space Flight Center, Greenbelt, Md.
For primary bibliographic entry see Field 7D.
For abstract, see STAR 05 11.
N67-22869 HC$3.00 MF$0.65

SOLVOLYTIC REACTIONS IN THE STEROID FIELD.
Eidgenossische Technische Hochschule, Zurich (Switzerland).
J.-J. Sugranes. 1965, 68p
Its Dissertation No. 3702

Descriptors: *Organic chemistry, *Steroid, Chemistry, Displacement, Nucleophile, Organic, Reaction, Solvent.

For abstract, see STAR 05 11.
N67-22997 HC$3.00 MF$0.65

ACIDITY OF CYCLOHEXANECARBOXYLIC ACIDS, CYCLOHEXYLAMINES AND RELATED COMPOUNDS.
Eidgenossische Technische Hochschule, Zurich (Switzerland).
C. P. Rigau. 1965, 59p PROM.-3763

Descriptors: *Carboxylic acid, *Physical chemistry, *Stereochemistry, Acid, Acidity, Amine, Carboxylic, Chemistry, Compound, Cyclohexane, Elution, Infrared, Measurement, Molecule, Physical, Relation, Spectroscopy, Structure, Thermodynamic.

For abstract, see STAR 05 11.
N67-23014 HC$3.00 MF$0.65

STUDIES IN RING EXPANSION FINAL SCIENTIFIC REPORT, 1 JAN. 1963 - 31 DEC. 1966.
Glasgow Univ. (Scotland). Dept. of Chemistry.
G. L. Buchanan. 31 Dec 66, 11p AFOSR-67-0036, AD-645488
Contract AF-EOAR-63-36

Descriptors: *Molecular structure, *Ring, *Synthesis, Alkaloid, Bridge, Carbon, Chemistry, Expansion, Fission, Molecular, Octane, Structure.

For abstract, see STAR 05 11.
N67-23238 HC$3.00 MF$0.65

SYNTHESES DE L'ACIDE DELTA AMINOLEVULIQUE APPLICATION A L'INTRODUCTION DE CARBONE 14 ET DE TRITIUM (Synthesis of Delta-Aminolevulic Acid. Application to the Introduction of Carbon-14 and of Tritium).

Commissariat a l'Energie Atomique, Saclay (France). Centre d'Etudes Nucleaires.
For primary bibliographic entry see Field 7E.
PB-174 564 HC$3.00 MF$0.65

7D. PHYSICAL CHEMISTRY

THERMODYNAMIC AND COMPOSITION DATA FOR CONSTANT-VOLUME COMBUSTION OF STOICHIOMETRIC MIXTURES OF HYDROGEN-OXYGEN DILUTED WITH HELIUM OR HYDROGEN,
Toronto Univ. (Ontario). Inst. for Aerospace Studies.
For primary bibliographic entry see Field 21B.
AD-455 747 HC$3.00 MF$0.65

ULTRAHIGH RESOLUTION DELTA F-0, PLUS OR MINUS 1 (He) (+)HFS SPECTRA BY AN ION-STORAGE COLLISION TECHNIQUE.
Technical rept.,
Washington Univ Seattle Dept of Physics
E. N. Fortson, F. G. Major, and H. G. Dehmelt.
13 Dec 65, 12p Rept no. TR-8
Contract Nonr-477 (25)
Supported by NSF and ARO (D).
Availability: Published in Physical Review Letters v16 n6 p221-5 Feb 7 1966.

Descriptors: (*Helium, Radiofrequency spectroscopy), Ground state, Ions, Electron transitions, Line spectrum, Precession, Microwave spectroscopy.

A study was made of the hfs spectra of ground-state (He3) (+) ions contained in a quadrupole rf ion trap. Linewidths as narrow as 10 Hz have been obtained thus far, demonstrating the long phase-memory times of the internal precession realizable in the technique. (Author)
AD-650 630 Not available from CFSTI.

MULTILEVEL ATOM RADIATIVE TRANSFER PROBLEMS.
Rept. for 1 Jan 65-31 May 66,
Hawaii Univ Honolulu
John T. Jefferies, and Gerard D. Finn. Mar 67, 85p
AFWL-TR-66-131
Contract AF 29 (601)-6707

Descriptors: (*Atomic energy levels, Line spectrum), (*Electron transitions, Equations), Emissivity, Incoherent scattering, Probability, Sodium, Oxygen, Hydrogen, Continuous spectrum.

The report contains results of some investigations on line transfer problems in multi-level atoms. A discussion is presented of the formulation and methods of solution of the two-level problem. This procedure is generalized to a special case of the three-level atom and, on this basis, a discussion is given of the question of the equality of the depth dependence of source functions in multiplet lines. A discussion of the analogous problem for a four level atom is given. The solution of the transfer equation in the free bound continuum of an atom is considered, and some inherent difficulties in this problem are examined. A discussion is given of the transfer problem related to those found in the case of free bound continuum transfer. In Section VII consideration is given to the question of the degree of frequency coherence to be expected in a scattering process which is completely non-coherent in the frame of the atom. Finally an examination is made of the approximations used in the numerical procedures devised for solution of the transfer equation.
AD-650 631 HC$3.00 MF$0.65

IDENTIFICATION OF AEROSOL PROPELLANTS IN PAINT PRODUCTS BY GAS-LIQUID CHROMATOGRAPHY.
Army Coating and Chemical Lab Aberdeen Proving Ground Md
For primary bibliographic entry see Field 11C.
AD-650 642 HC$3.00 MF$0.65

THE SPECTROPHOTOMETRIC DETERMINATION OF AMMONIA AND LABILE AMINO COMPOUNDS IN FRESH AND SEAWATER BY OXIDATION TO NITRITE.
Washington Univ Seattle Dept of Oceanography
For primary bibliographic entry see Field 8D.
AD-650 650 Not available from CFSTI.

HEATS OF FORMATION OF ALPHA-BERYLLIUM CHLORIDE AND ALPHA- AND BETA-BERYLLIUM NITRIDE,
Fulmer Research Inst Ltd Stoke Poges (England)
P. Gross, C. Hayman, P. D. Greene, and J. T. Bingham. 23 May 66, 9p
AFOSR-67-0864
Contract AF 61 (052)-447
Availability: Published in Transactions of the Faraday Society v62 n526 pt10 p2719-24 Oct 1966.

Descriptors: (*Beryllium compounds, Heat of formation), Chlorides, Nitrides, Thermochemistry, Heat of reaction, Calorimetry, Crystal structure, Great Britain.
Identifiers: Beryllium chloride, Beryllium nitride.

Calorimetric determinations of the heats of reaction of beryllium and of alpha- and beta-beryllium nitride with chlorine enable the following heats of formation to be derived: Alpha'-BeCl2: = -117.1 plus or minus 0.4 kcal/mole, Alpha-Be3N2: = -141.0 plus or minus 1.6 kcal/mole, Beta-Be3N2: = -136.7 plus or minus 1.5 kcal/mole. A calorimetric determination of the heat of reaction of beryllium with ammonia gave a heat of formation of alpha-beryllium nitride, Alpha-Be3N2: = -140.5 plus or minus 0.3 kcal/mole. (Author)
AD-650 651 Not available from CFSTI.

MASS-SPECTROMETRIC STUDY OF THE THERMODYNAMIC PROPERTIES OF Zr-F SPECIES,
Philco-Ford Corp Newport Beach Calif Aeronutronic Div
Edmond Murad, and Donald Hildenbrand. 2 Aug 66, 4p
AFOSR-67-0889
Contract AF 49 (638)-1397
Availability: Published in Journal of Chemical Physics v45 n12 p4751-2 Dec 15 1966.

Descriptors: (*Zirconium compounds, Thermodynamics), (*Fluorides, Thermodynamics), Mass spectroscopy, Zirconium, Fluorine, Vapors, Chemical equilibrium, Heat of formation, Enthalpy.
Identifiers: Zirconium difluoride, Zirconium monofluoride, Zirconium trifluoride.

A mass-spectrometric study of the vapor effusing from a graphite Knudsen cell which contained CaF2 and Zr yielded E (ZrF3-F) = 156 plus or minus 5 Kcal/mole, E (ZrF2-F) = 141 plus or minus 5 Kcal/mole. E (ZrF-F) and (Zr-F) were estimated to be 176 and 148 Kcal/mole, respectively. (Author)
AD-650 657 Not available from CFSTI.

ABSOLUTE INFRARED INTENSITY MEASUREMENTS ON THE FUNDAMENTAL OF NO,
California Univ San Diego La Jolla Dept of the Aerospace and Mechanical Engineering Sciences
P. Varanasi, and S. S. Penner. 15 Aug 66, 4p
Contract Nonr-2216 (00)
Availability: Published in Journal of Quantitative Spectroscopy and Radiative Transfer v7 p279-82 1967.

Descriptors: (*Nitrogen oxides, *Infrared spectroscopy), Band spectrum, Spectra (Infrared), Intensity, Chemical bonds.

The integrated intensity for the fundamental vibration-rotation band of NO was redetermined, using the method of self-broadening. The cell length was measured by performing an absolute calibration experiment with CO, the integrated intensity (alpha-CO) of which was assumed to have the value alpha-CO = 237/sq cm/atm at room temperature. The best estimate for alpha-NO is 128 plus or minus 10/sq cm/atm at S.T.P. (Author)
AD-650 659 Not available from CFSTI.

CONCENTRATION PROFILES OF BARIUM AND LEAD IN ATLANTIC WATERS OFF BERMUDA,
Scripps Institution of Oceanography La Jolla Calif
For primary bibliographic entry see Field 8J.
AD-650 663 Not available from CFSTI.

DEEP-SEA IRON DEPOSIT FROM THE SOUTH PACIFIC,
Miami Univ Fla Inst of Marine Science 1004
For primary bibliographic entry see Field 8G.
AD-650 695 Not available from CFSTI.

DEEP-SEA AUTHIGENIC CALCITE AND DOLOMITE,
Miami Univ Fla Inst of Marine Science 1004
For primary bibliographic entry see Field 8G.
AD-650 696 Not available from CFSTI.

COMPARISON BETWEEN MOLECULAR AND TURBULENT DIFFUSION PROCESSES,
David Taylor Model Basin Washington D C Applied Mathematics Lab
For primary bibliographic entry see Field 20D.
AD-650 698 Not available from CFSTI.

ABSORPTION SPECTRUM OF ACTIVATED NITROGEN IN THE 600 - 1100-A REGION.
Physical Sciences Research Papers no. 312,
Air Force Cambridge Research Labs L G Hanscom Field Mass
R. E. Huffman, J. C. Larrabee, and Y. Tanaka.
24 Jun 66, 13p Rept no. AFCRL-67-0109
Availability: Published in Journal of Chemical Physics v45 n9 p3205-13 Nov 1 1966.

Descriptors: (*Nitrogen, *Ultraviolet spectroscopy), Molecular energy levels, Band spectrum, Absorption spectrum, Gas discharges, Excitation, Atomic energy levels, Afterglows, Tables.

Activated nitrogen produced by a microwave discharge has a large number of absorption bands in the 600 - 1100-A region in addition to bands of ordinary nitrogen. The present analysis indicates that the additional bands belong to the same band systems as the ordinary nitrogen bands in this region, but the bands are produced by transitions from v>0 levels of the ground state. A brief note concerning the atomic absorption spectrum of nitrogen in the same region is included. (Author)
AD-650 704 Not available from CFSTI.

THE INTERACTION OF NITROUS OXIDE WITH GERMANIUM SURFACES,
Lehigh Univ Bethlehem Pa Surface Chemistry Lab
R. D. Iyengar, and A. C. Zettlemoyer. 1965, 13p
AROD-4720:5
Grant DA-ARO (D)-31-124-G525
Availability: Published in Journal of Colloid Science, v20 p857-66 1965.

Descriptors: (*Nitrogen oxides, Semiconductors), (*Germanium, Surfaces), Oxides, Films, Oxida-

tion, Labeled substances, Decomposition, Chemical Bonds.
Identifiers: Surface chemistry.

The interaction of nitrous oxide with real (oxide-coated) surfaces of both n- and p-type germanium was investigated in the range of 10-300 torr and 200-400C. The n-type samples promoted greater decomposition than the p-type samples. In all cases studied, not a trace of oxygen resulting from the decomposition could be detected in a mass spectrometer; obviously, the oxygen was incorporated in further oxide film formation. Pretreatment of germanium with oxygen decreased the extent of its interaction with nitrous oxide. Experiments with a 34% enriched 15N14N16O clearly showed that the decomposition mechanism primarily consists of the rupture of the N-O bond to set a nitrogen molecule free. (Author)
AD-650 706 Not available from CFSTI.

LADDER POLYQUINOXALINES,
Iowa Univ Iowa City Dept of Chemistry 1601
J. K. Stille, and E. L. Mainen. 24 Jun 66, 7p
AROD-5199:3
Contract DA-31-124-ARO (D)-295
Availability: Published in Polymer Letters v4 p665-7 1966.

Descriptors: (*N-heterocyclic compounds, *Polymers), (*Polycyclic compounds, Polymers), Thermal stability, Solubility, Viscosity, Polymerization, Ketones, Amines.
Identifiers: Ladder polymers, Polyquinoxalines.

In a previous communication (see AD-632 262), it was suggested that the lack of thermal stability of the ladder polyquinoxalines generated by the condensation of 2,5-dihydroxy-p-benzoquinone and 1,2,4,5-tetraaminobenzene tetrahydrochloride was due to incomplete ladder formation. The structural fault was attributed to the inability of 2,5-dihydroxy-p-benzoquinone to react as a true tetraketone. In an effort to test this and to obtain an aromatic ladder polymer, 1,2,6,7-tetraketopyrene, a ketone which can have no enol content, was employed as the tetracarbonyl moiety. (Author)
AD-650 707 Not available from CFSTI.

THE KINETICS OF ION ASSOCIATION IN MANGANESE SULFATE SOLUTIONS. II. THERMODYNAMICS OF STEPWISE ASSOCIATION IN WATER.
Maryland Univ College Park Dept of Chemistry
Gordon Atkinson, and S. K. Kor. 13 Sep 66, 8p
AROD-3417:4
Grant DA-ARO (D)-31-124-G502
See also AD-644 797.
Availability: Published in Journal of Physical Chemistry, v71 n3 p673, Feb 1967.

Descriptors: (*Manganese compounds, Reaction kinetics), (*Sulfates, Reaction kinetics), Recombination reactions, Thermochemistry, Ultrasonic radiation, Absorption, Enthalpy, Entropy, Free energy.
Identifiers: Manganese sulfates, Sonochemistry.

Ultrasonic absorption was measured in aqueous MnSO4 solutions at 20, 25, and 30C in the frequency range 2-250 Mc. The data are interpreted in terms of the Eigen three-step ion-association mechanism using a Bjerrum association constant for the first step. From the rate constants obtained, it is possible to calculate the increments of F, H, and S for each of the three steps. The mechanism of the association process is discussed in terms of the thermodynamic parameters obtained. (Author)
AD-650 710 Not available from CFSTI.

DIFFUSION IN ORGANIC CRYSTALS.
Franklin Inst Research Labs Philadelphia Pa
Chemistry Dept
For primary bibliographic entry see Field 20I..
AD-650 740 HC$3.00 MF$0.65

THE THERMODYNAMIC PROPERTIES OF THE ALUMINUM SILICATES.
Chicago Univ Ill
For primary bibliographic entry see Field 8G.
AD-650 749 Not available from CFSTI.

MOMENTUM TRANSFER AND INELASTIC COLLISION CROSS SECTIONS FOR ELECTRONS IN O2, CO AND CO2.
Scientific paper,
Westinghouse Research Labs Pittsburgh Pa Atomic and Molecular Sciences
R. D. Hake, Jr., and A. V. Phelps. 7 Oct 66, 91p
Rept no. TR-35, 66-1E2-GASES-P1
Contract Nonr-2584 (00), ARPA Order-125
Availability: Submitted for publication in Physical Review.

Descriptors: (*Electrons, Interactions), (*Oxygen, Electron bombardment), (*Carbon monoxide, Electron bombardment), (*Carbon dioxide, Electron bombardment), Inelastic scattering, Gas ionization, Probability, Molecular energy levels, Excitation, Momentum.
Identifiers: Defender project.

Momentum transfer and inelastic collision cross sections for electrons in O2, CO and CO2 are calculated from measured values of the electron drift velocity, characteristic energy, attachment coefficient, and ionization coefficient. The experimental data for O2 is most consistent with vibrational excitation cross sections consisting of a series of resonances located at the vibrational energy levels of the negative ion and having values of cross section times energy-half-width of the order of 10 to the -18 power sq. cm -eV. The calculated effective dipole moment for rotational excitation of CO is in very good agreement with values obtained by other techniques. The vibrational excitation cross section for CO at electron energies below 1 eV is in agreement with theoretical predictions. The vibrational excitation cross sections required for consistency with the CO2 data are very large and include a peak very close to the vibrational threshold of 0.083 eV. (Author)
AD-650 751 Not available from CFSTI.

A STUDY OF RANDOM NETWORK MODELS. CHARACTERIZATION OF A 300-UNIT TETRAHEDRAL NETWORK AND COMPARISON WITH VITREOUS SILICA AND LIQUID WATER.
Technical rept.,
Melpar Inc Falls Church Va
Fred Ordway. 7 Apr 67, 82p Rept no. TR-1, 6353.00100
Contract N00014-66-C-0258

Descriptors: (*Molecular structure, Models (Simulations)), (*Glass, Molecular structure), (*Silicon dioxide, Molecular association), (*Water, Molecular association), Condensation, Chemical bonds, Networks, Crystal lattices, Nucleation, Simulation, Computer programs, Topology, Statistical analysis.

A fully bonded tetrahedral network model was built, by a procedure approximately simulating condensation from vapor, up to a total of 300 units. From the topological data and measured coordinates of the centers and vertices, the ring size distribution, average density, and radial distribution functions were calculated. Although this model contained a large regular nucleus, and therefore does not fully represent the random network theory, the close similarity of its radial distribution with that of vitreous silica indicates that such networks can represent real amorphous structures quite accurately. Matching the densities of liquid water and vitreous silica may require imperfections in bonding of the network. The topological and geometrical data, which define the structure completely, are reproduced in full. (Author)
AD-650 754 HC$3.00 MF$0.65

ZERO PHONON LINES IN DIAMOND AND L... CALIZED MODES,
Israel Atomic Energy Commission Yavne So... Research Establishment
Robert Englman. 21 Aug 64, 8p Rept no. Scient... fic-2
AFCRL-67-0139
Contract AF 61 (052)-759
Availability: Published in Journal of Physi... Chemical Solids v26 p1039-44 1965.

Descriptors: (*Diamonds, *Line spectrum), Isa... Phonons, Excitation, Luminescence, Intensity.

The vibrational structures for emission and a... sorption of the 415 mu system in diamond indica... that genuinely localized vibrations are brought in... play. These vibrations affect the intensity of t... zero-phonon line; however, the decrease with te... perature of the intensity arises not from these l... from the phonon-continuum. The observed te... perature change in the line-width is apparently d... to the discrete modes, while the temperature var... tion of the shift may be traced to either the discre... or the continuous modes, with the weight of expe... imental evidence favouring the latter. (Author)
AD-650 756 Not available from CFST...

ELECTRON LOSS PROCESSES IN IONIZ... GASES.
Pittsburgh Univ Pa Dept of Physics
For primary bibliographic entry see Field 20I.
AD-650 772 Not available from CFST...

LABORATORY MEASUREMENTS OF ELE... TRON-ION RECOMBINATION COEFFICIENTS.
Pittsburgh Univ Pa Dept of Physics
For primary bibliographic entry see Field 20I.
AD-650 773 Not available from CFST...

RELATIONSHIP BETWEEN THE STEP-WI... STABILITY CONSTANTS OF COORDINATIO... COMPOUNDS AND THE NUMBER OF LIGAN... (ORGANIC LIGANDS),
Foreign Technology Div Wright-Patterson AF... Ohio
Ma Teng-yung. 25 Jan 67, 17p Rept no. FTD-HT-66-569
TT-67-61598
Edited trans. of Hua Hsueh T'ung Pao (Chine... People's Republic), n7 p43-7 1965.

Descriptors: (*Complex compounds, Stability), (*Chelate compounds, Stability), Reaction kine... ics, Equations, Stereochemistry, Electrostatic... Molecular association, China.

For a polydentate complex (chelate) a steric a... rangement of the coordinating group in space pro... duces a strong effect on log kn and n. The com... pound with a higher charged central ion (e.g. T... (+4)) shows linear change but the compound wit... a lower charge central ion (e.g. Co (+2) and N... (+2)) shows a nonlinear relationship between lo... kn and n. The result still could not be explained... because lambda could not be calculated from th... dipole moment of a coordinating group or the ele... trical charge of coordinating atoms in comple... ions. However, the nonlinear relationship for th... chelates could be shown by the semiempirical... equation log k2 = log k1 -2 (lambda ((n sq)-1). (Au... thor)
AD-650 798 HC$3.00 MF$0.6...

INVESTIGATION OF THE KINETICS OF CON... DENSATION.
Interim rept., 1 Jul 66-31 Jan 67,
Berg (T G Owe) Inc Santa Ana Calif
T. G. Owe Berg, and D. C. George. Feb 67, 17p
ECOM-0080-1
Contract DAAB07 67-C-0080

Descriptors: (*Condensation, Dynamics), Water vapor, Drops, Nucleation, Cloud chambers, High-speed photography.

The primary objectives of this work were to investigate the operating conditions of the Aitken nucleus counter and to elucidate the basic mechanisms of condensation with a view to applications in cloud physics. The apparatus used in the study consisted of a Wilson-type cloud chamber in which the condensation phenomena could be observed by either high speed camera or light extinction measurements. In this manner rates of condensation were noted and also the effect of nucleation by solid particulates of reacting gases such as ammonia and hydrochloric acid was studied. (Author)
AD-650 848 HC$3.00 MF$0.65

ATOMIC ABSORPTION ANALYSIS FOR Ca, Cr, Co, Cu, Fe, Pb, Li, Mg, Mn, Ni, K, Rb, Na, AND Sr IN THE HUDSON RIVER.
Technical rept.,
Columbia Univ Dobbs Ferry N Y Hudson Labs
Burton P. Fabricand, Eugene S. Imbimbo, and Mary E. Brey. 28 Feb 67, 18p Rept no. TR-136
Contract Nonr-266 (84)

Descriptors: (*Atomic spectroscopy, Chemical analysis), (*Rivers, Chemical analysis), Absorption, Sampling, Spectrophotometers, Conductivity, Water, Salinity, Salinometers, Measurement, Chemical elements, Water pollution, Metals.

The concentrations of Ca, Cu, Li, Mg, K, Na, and Sr at various points in the Hudson River and one of its tributaries during July, 1965, have been measured along with the conductivity of the water. Ca, Mg, K, Na, and Sr all show a minimum in concentration about 130 km from the mouth of the river as does the conductivity. Concentration values in ppm averaged over samples taken from three points upstream from the minimum are as follows: Ca, 24.5; Cu, 0.01; Mg, 6.7; K, 1.2; Na, 15.7; Sr, 0.14. There is a large contribution to these elements from ocean waters at least as far as West Point, New York, 90 km from the mouth. Upper limits on the concentrations of Cr, Co, Fe, Pb, Li, Mn, Ni, and Rb were established. (Author)
AD-650 853 HC$3.00 MF$0.65

SYSTEM DEVELOPMENT PLAN FOR A NATIONAL CHEMICAL INFORMATION SYSTEM.
Information Management Inc Burlington Mass
For primary bibliographic entry see Field 5B.
AD-650 900 HC$3.00 MF$0.65

SYSTEM PERFORMANCE SPECIFICATION FOR A NATIONAL CHEMICAL INFORMATION SYSTEM.
Information Management Inc Burlington Mass
For primary bibliographic entry see Field 5B.
AD-650 901 HC$3.00 MF$0.65

THE EXCITATION OF ELECTRONIC AND OTHER DEGREES OF FREEDOM IN A HYPERSONIC SHOCK WAVE IN AIR.
Institute for Defense Analyses Arlington Va Research and Engineering Support Div
For primary bibliographic entry see Field 20D.
AD-650 950 HC$3.00 MF$0.65

EXPERIMENTAL UPPER LIMIT FOR THE PERMANENT ELECTRIC DIPOLE MOMENT OF Rb85 BY OPTICAL-PUMPING TECHNIQUES.
Doctoral thesis,
Washington Univ Seattle
E. S. Ensberg. 25 Jul 66, 11p
AROD-4091:3
Contract Nonr-477 (25), Grant DA-ARO (D)-31-124-G781
Research supported in part by NSF, and AFOSR.
Availability: Published in The Physical Review v153 n1 p36-43 Jan 5 1967.

Descriptors: (*Atomic orbitals, Dipole moments), (*Rubidium, Dipole moments), Electric moments, Pumping (Optical), Zeeman effect, Ground state, Magnetic resonance, Stark effect.

An optical-pumping experiment designed to detect a permanent electric dipole moment in the ground state of the Rb85 atom is described. It has the advantage of averaging out the motional magnetic fields that limit the more recent related atomic-beam results. The applied electric fields were necessarily smaller. Zeeman transitions in free Rb85 atoms in the earth's magnetic field (about 210 kc/sec) were observed in evacuated, wall-coated absorption cells under electric fields up to plus or minus 2000 V/cm. Modulation of the light beam by precessing atoms was used to operate the samples as self-excited oscillators. The difference in frequency between two Rb85 oscillators operating side by side in the same light beam was measured to reduce the effect of magnetic field fluctuations. This frequency difference (about 300 cps) was found to be stable to within plus or minus 0.1 cps (e.g., corresponding to magnetic-field variations between samples of 0.0000002 G for 30-min periods, under favorable conditions), and was found to be independent of the electric field applied to one of them within that limit. It was concluded that the permanent electric dipole moment of the Rb85 atomic ground state, if it exists, is less than e x (10 to the -18th power cm), where e is the electronic charge. The theory of optically pumped alkali oscillators is developed for arbitrary nuclear spin in the limit of low light intensities (the high-resolution case). (Author)
AD-650 955 Not available from CFSTI.

PREDICTION OF ABSOLUTE ENTROPIES FROM GAS CHROMATOGRAPHIC RETENTION DATA.
Interim rept.,
Naval Research Lab Washington D C
Frederick W. Williams, and Homer W. Carhart.
16 Dec 66, 18p Rept no. NRL-6529

Descriptors: (*Gas chromatography, *Entropy), (*Hydrocarbons, Entropy), (*Ketones, Entropy), (*Alcohols, Entropy), Thermochemistry, Alkanes, Predictions, Molecular structure, Organic compounds.

Absolute entropies of compounds in homologous series of hydrocarbons, ketones, and alcohols were found to be directly related to the logarithm of the retention volumes obtained from gas-liquid chromatographic measurements. Different liquid substrates and column temperatures have been employed in the collection of retention data. The retention volume method can be employed as a fast and relatively inexpensive way of predicting absolute entropies of organic compounds. (Author)
AD-651 036 HC$3.00 MF$0.65

EXPERIMENTAL INVESTIGATION OF THE ABSORPTION OF INFRARED RADIATION.
Annual technical summary rept., 1 Aug 61-31 Dec 65,
Philco-Ford Corp Newport Beach Calif Aeronutronic Div
Darrell E. Butch, and David A. Bryvnak. 30 Jan 66, 14p Rept no. U-3416
Contract Nonr-3560 (00), ARPA Order-237

Descriptors: (*Infrared radiation, Absorption), (*Water vapor, Spectra (Infrared)), (*Carbon dioxide, Spectra (Infrared)), Atmosphere, Emissivity, Band spectrum, Flames, Infrared spectroscopy.

The work involves an experimental investigation of the absorption of infrared radiation by atmospheric gases, and a study of the emission by H2O and CO2 at temperatures as high as 2000K. Several hundred absorption spectra of H2O and CO2 samples near room temperature were obtained in the 0.7 to 5.5 micron region. The samples varied in path length from 1 cm to 933 meters and pressures ranged from approximately 5 microns Hg to 15 atmospheres. Strengths of many of the bands were determined and the widths of many of the individual lines were calculated. Abstracts of the technical reports and papers are presented. (Author)
AD-651 043 HC$3.00 MF$0.65

EFFECT OF ADSORBED WATER UPON THE SPREADING OF ORGANIC LIQUIDS ON SODA-LIME GLASS.
Interim rept.,
Naval Research Lab Washington D C
Elaine G. Shafrin, and W. A. Zisman. 24 Mar 67, 29p Rept no. NRL-6496

Descriptors: (*Glass, Surface properties), (*Organic materials, Films), Water, Adsorption, Monomolecular films, Surface tension, Humidity, Surface-active substances, Adhesion, Hydrocarbons, Halogenated hydrocarbons.
Identifiers: Surface chemistry.

Results are given of an investigation of the extent to which water adsorbed on a silicate glass surface affects the spreading and the equilibrium contact angle of various pure organic liquids. Of especial interest is the effect of the transition of the physically adsorbed water film from a polymolecular to a monomolecular film. These results can be related to the effect of adsorbed water on the spreading or adhesion of resins to glass and other hydrophilic solids and to the problem of developing better adhesives for dental fillings.
AD-651 056 HC$3.00 MF$0.65

THE KINETICS OF THE THERMAL DECOMPOSITION OF MOLTEN SILVER AZIDE.
Army Engineer Research and Development Labs Fort Belvoir Va
For primary bibliographic entry see Field 19A.
AD-651 062 HC$3.00 MF$0.65

TABLE OF HARTREE-FOCK SELF CONSISTENT FIELD WAVE FUNCTIONS WITH EXCHANGE. SUPPLEMENT III,
Aerospace Research Labs Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 3B.
AD-651 072 HC$3.00 MF$0.65

ARGON ELECTRON TRANSITION TABLES.
Scientific interim rept., Dec 65-Dec 66,
Northwestern Univ Evanston Ill Gas Dynamics Lab
A. E. Wright, Jr., D. L. Evans, R. S. Tankin, and A. B. Cambell. Jan 67, 379p
ARL-67-0016
Contract AF 33 (615)-1160

Descriptors: (*Argon, *Electron transitions), Line spectrum, Atomic energy levels, Ions, Selection rules, Tables.

Electron transition data for argon (atom through the seventh ion), for wavelengths between 0 and 10,000 Angstrom units, is presented. Corrections in the wavelength of the transitions to account for air at atmospheric pressure have been made for transitions above 2,000 A. (Author)
AD-651 077 HC$3.00 MF$0.65

A SIMPLE EPR SPECTROMETER.
Foreign Technology Div Wright-Patterson AFB Ohio
Shu Kwang-tze, Huang Shou-ling, Tang You-chi, and Hu Jih-heng. 25 Jan 67, 15p Rept no. FTD-TT-65-2010
TT-67-61673

Edited trans. of Hua Hsueh Hsueh Pao (Chinese People's Republic) v29 n4 p373-8 1963.

Descriptors: (*Spectrometers, Design), (*Paramagnetic resonance, Spectrometers), Resonant frequency, X band, Oscillators, Oscilloscopes, Benzene, Cavity resonators, Free radicals, China.

A review is given of various types of spectrometers in current use. Construction details of a simple X-band electromagnetic resonance spectrometer is given, and the performance is noted. Tests showed that its sensitivity is such that 3 to the 10 to the minus 8th power mole of DPPH (1.1 diphenyl-2 picryl hydrazyl) can be detected by an oscilloscope with a signal to noise ratio of 15 to 1.
AD-651 083 HC$3.00 MF$0.65

MATTING OF ALUMINUM AND ITS ALLOYS.
Foreign Technology Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 11C.
AD-651 088 HC$3.00 MF$0.65

DETERMINATION OF THE SURFACE AREAS OF SELECTED SOLIDS.
Research and development rept.,
Navy Marine Engineering Lab Annapolis Md
Norman L. Hatfield. Mar 67, 32p Rept no. MEL-27/67

Descriptors: (*Surface area, *Solids), (*Adsorption, *Physical chemistry), Molecular properties, Measurement, Theory, Molecular association, Pressure, Temperature, Carbon, State-of-the-art reviews, Glass, Sublimation, Instrumentation, Errors, Naval research.

Because of the many applications of solid-gas interface phenomena in Navy technology, a study was made of methods for the determination of the surface area of solids with the purpose of investigating new adsorbents. After a review of the literature on the many techniques for measuring surface area, the dynamic flow methods using the Brunauer-Emmett-Teller theory of molecular adsorption was selected. The error in this method is less than 5 percent, and the instrumentation required is not overly complicated. The instrumentation was set up, sample treatment and measuring techniques were standardized, and the surface areas of selected materials were determined. The values ranged from a high of almost 1000 square meters per gram for activated carbon to a low of 0.078 squares meters per gram for glass beads. (Author)
AD-651 102 HC$3.00 MF$0.65

THERMODYNAMIC PROPERTIES OF LIQUID WATER TO ONE KILOBAR.
Naval Ordnance Lab White Oak Md
For primary bibliographic entry see Field 20M.
AD-651 105 HC$3.00 MF$0.65

FINAL SCIENTIFIC REPORT.
Rept for 2 Feb 66-28 Feb 67,
Oslo Univ (Norway) Inst for Theoretical Physics
John Midtdal. 28 Feb 67, 7p
AFOSR-67-0899
Grant AF-EOAR-33-66

Descriptors: (*Atomic orbitals, Perturbation theory), (*Atomic energy levels, Perturbation theory), Wave functions, Helium, Hydrogen, Ionization, Electron transitions, Norway.

Theoretical and numerical investigations for closed states of two-electron atoms and ions, with perturbation theory expansions of their wave functions, non-relativistic energies and various corrections. Numerical calculations of the energy of some quasi-discrete and autoionizing states for He and H (-), using the scaling-variation orthogonalization procedure. (Author)
AD-651 117 HC$3.00 MF$0.65

SOLUTION CHEMISTRY.
Final rept., 1 Oct 62-15 Mar 67,
Royal Inst of Tech Stockholm (Sweden) Dept of Inorganic Chemistry
L. G. Sillen. 15 Mar 67, 11p
AFOSR-67-0952
Grants AF-EOAR-8-63, AF-EOAR-22-65

Descriptors: (*Complex compounds, Thermochemistry), (*Chemical equilibrium, Solutions), Hydrolysis, Oxides, Vanadates, Niobates, Molybdates, Borates, Silicates, Germanium compounds, Zinc compounds, Aluminates, Chlorides, Fluorides, Computer programs, Sea water, Selenium, Carriers (Semiconductors), Sweden.

A summary is given of studies involving the thermodynamics of formation of coordination compounds, and the mechanisms of formation of metalates in alkaline solution. Topics include: Thermochemical studies; Equilibrium studies (Vanadates, Niobates, Molyboates, Rhenium, Ruthenium, Zincates, Borates, Silicates, Germanates, Aluminates, Tellurates, Chloride complexes in organic solvents, Fluorides, Hydration of ions); Improvement of methods; Computer methods; The chemistry of sea water; Charge carriers in liquid selenium. A listing of the 44 papers generated under the grants is included.
AD-651 118 HC$3.00 MF$0.65

MOSSBAUER EFFECT STUDIES OF SURFACE REACTIONS.
Virginia Inst for Scientific Research Richmond
For primary bibliographic entry see Field 7E.
AD-651 129 HC$3.00 MF$0.65

MAGNETIC RELAXATION IN CRYSTALS.
Washington Univ Seattle
For primary bibliographic entry see Field 20H.
AD-651 133 HC$3.00 MF$0.65

DETERMINATION OF MOLECULAR WEIGHT BY USING AN ANALYTICAL ULTRACENTRIFUGE.
Army Biological Labs Frederick Md
V. Ya. Chernyak. Apr 66, 10p Rept no. Trans-1671
TT-67-61703
Trans. of Biofizika (USSR), v9 n2 p239-41 1964.

Descriptors: (*Molecular weight, Determination), Ultracentrifuges, Sedimentation, Experimental data, USSR.

The modification of the method of Archibald--Kegeles, incorporated with the use of a boundary forming cell filled with two solutions of the same high molecular compound in the same solvent, but with different concentrations, makes it possible, according to the theory developed, to calculate the apparent molecular weight at the meniscus and at the bottom of the cell from the data of one experiment. (Author)
AD-651 169 HC$3.00 MF$0.65

INVESTIGATION OF MECHANISMS FOR ELECTROCHEMICAL CATALYSIS.
Pratt and Whitney Aircraft East Hartford Conn
For primary bibliographic entry see Field 10B.
AD-651 194 HC$3.00 MF$0.65

OPACITY OF HOT, HIGHLY COMPRESSED HYDROGEN.
Final rept., 14 Jan-14 Jul 66,
Naval Ordnance Lab White Oak Md
George T. Labus, and Gordon L. Hammond. 9 Feb 67, 57p Rept no. NOLTR-66-202
NASA-CR-77116

Descriptors: (*Hydrogen, Optical properties), Absorption spectrum, Continuous spectrum, High-pressure research, High-temperature research, Helium, High-pressure compressors, Impurities, Line spectrum, Gaseous rocket propellants.

The rapid gas compression technique employing a ballistic piston compressor was adapted to the study of the opacity of hydrogen at elevated pressures and temperatures. Hydrogen/helium mixtures were compressed for short times to pressures and temperatures exceeding 2500 atmospheres and 5000K, and the emission spectra were recorded and analyzed. The discrete line spectra were identified as due to metallic impurities, but the strong background continua could not be ascribed unequivocally to hydrogen. Computer calculations of the specie concentrations that comprise hot, highly compressed hydrogen/helium mixtures were made, and possible opacity producing mechanisms were advanced to explain the observed continua. (Author)
AD-651 203 HC$3.00 MF$0.65

STUDY OF SOLUTION DEOXYGENATION AND SPECIMEN PRETREATMENT TECHNIQUES FOR USE IN THE HYDROGEN PERMEATION APPARATUS,
Naval Air Engineering Center Philadelphia Pa Aeronautical Materials Lab
For primary bibliographic entry see Field 11F.
AD-651 211 HC$3.00 MF$0.65

CRYSTAL CHEMISTRY OF DEFECTIVE STRUCTURES IV - CHANGE OF A P-TYPE SEMICONDUCTOR INTO A N-TYPE SEMICONDUCTOR BY VAPOR TREATMENT.
Pennsylvania State Univ., University Park.
For primary bibliographic entry see Field 20L.
ATI-125 138 HC$3.00

PLUTONIUM ABSTRACTS. VOLUME 6, NUMBER 11.
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
31 Dec 66, 74p
Contract AT (45-1)-1830

Descriptors: (*Plutonium, Abstracts), Biology, Medicine, Chemistry, Physics, Nuclear engineering, Health physics, Safety, Metallurgy, Ceramic materials.

For abstract, see NSA 21 09.
BNWL-113-23 HC$3.00 MF$0.65

QUANTUM MECHANICAL CALCULATIONS OF THE SECOND VIRIAL COEFFICIENTS FOR HYDROGEN.
National Bureau of Standards, Washington, D.C.
For primary bibliographic entry see Field 20J.
NBS-TN-412 HC$0.15 MF$0.65

UNUSUAL RESONANCE LINES OF HIGHLY IONIZED ATOMS OF THE FIRST LONG PERIOD.
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
L. Cohen, and U. Feldman. Feb 67, 9p NASA-TM-X-55737, X-614-67-112

Descriptors: *Ionization, *Resonance, *Spectral line, Atom, Energy, Ion, Level, Line, Spectral, Spectrogram, Transition, Wavelength.

For abstract, see STAR 05 11.
N67-22076 HC$3.00 MF$0.65

NEWLY IDENTIFIED LINES IN NE I ISOELECTRONIC SEQUENCES.
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

L. Cohen, and U. Feldman. Feb 67, 9p NASA-TM-X-55734, X-614-67-55

Descriptors: *Ionization, *Scandium, *Spectral line, *Titanium, *Vanadium, Cobalt, Copper, Grazing, Incidence, Level, Line, Nickel, Source, Spark, Spectral, Spectrometry, Transition.

For abstract, see STAR 05 11.
N67-22080 HCL.00 MF$0.65

VIBRATIONAL DISSOCIATION AND CASCADE DISSOCIATION OF H2+ IONS BY COLLISION WITH MOLECULES OF A GAS.
Dissociation Vibrationnelle Et Dissociation en Cascade D'ions H2a Par Collisions Avec les Molecules D'un Gaz
Commissariat A L Energie Atomique, Fontenay-Aux-roses (France).
P. Verveer. 1966, 61p CEA-R-2983, EUR-2767.F
Contract EURATOM-007-62-1 FUAF
in French

Descriptors: *Collision, *Hydrogen, *Ionic collision, *Molecular dissociation, Acceleration, Cascade, Dissociation, Gas, Ionic, Molecular, Proton, Source, Spectral resolution, Structure, Vibration.

For abstract, see STAR 05 11.
N67-22135 HC$3.00 MF$0.65

ON THE THEORY OF VIBRATIONAL RELAXATION IN GASES.
Manchester Univ. (England). Dept. of Mathematics.
E. Wild. Mar 63, 10p ARC-CP-725, ARC-24617
10 P Refs

Descriptors: *Gas, *Molecular interaction, *Vibrational relaxation, Coordinate, Energy, Equilibrium, Excitation, Interaction, Molecular, Nonlinear, Relaxation, Temperature, Thermal, Transition, Vibration, Zero.

For abstract, see STAR 05 11.
N67-22794 HC$3.00 MF$0.65

ANALYTICAL DEVELOPMENT WORK ON BIS-(PHENOXYPHENYL) ETHERS, MIX 4 P3 E.
Aerojet-general Corp., Azusa, Calif.
R. R. Jay. 27 Oct 64, 17p NASA-CR-72196, TM-390-64-4-249

Descriptors: *Ether, *Gas chromatography, *Infrared spectroscopy, *Nuclear magnetic resonance, Analysis, Characterization, Chemical, Chromatography, Control, Gas, Impurity, Infrared, Magnetic, Nuclear, Phenol, Phenyl, Quality, Resonance, Spectroscopy.

For abstract, see STAR 05 11.
N67-22852 HC$3.00 MF$0.65

SYNTHESIS OF HIGHER ORDER HYDROCARBONS ON HOT TUNGSTEN FILAMENTS.
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
B. N. Paxson, and H. Shapiro. Apr 67, 11p
NASA-TN-D-3906
Contract 124-09-04-04-51

Descriptors: *Hydrocarbon, *Mass spectrometer, *Partial pressure, *Quadrupole, *Synthesis, Acetylene, Ethane, Filament, Mass, Measurement, Partial, Pressure, Propane, Propylene, Relation, Spectrometer, Temperature, Total.

For abstract, see STAR 05 11.
N67-22869 HC$3.00 MF$0.65

STUDY OF BONDING BETWEEN GLASS AND PLASTIC IN GLASS-REINFORCED PLASTICS-EXTENDED WORK QUARTERLY PROGRESS REPORT, OCT. 1 - DEC. 31, 1966.
Stanford Research Inst., Menlo Park, Calif.
For primary bibliographic entry see Field 11I.
For abstract, see STAR 05 11.
N67-22875 HC$3.00 MF$0.65

BINDING ENERGIES OF THE NEXT INNER SUBSHELL OF ATOMS AND IONS FROM B TO ZN.
Institut Fur Plasmaphysik G.M.B.H., Garching (West Germany).
W. Lotz. Oct 66, 22p IPP-1/54

Descriptors: *Binding energy, *Electron impact, *Ionization cross section, Atom, Binding, Cross section, Electron, Element, Energy, Impact, Inner, Ion, Ionization, Potential, Shell, Stage.

For abstract, see STAR 05 11.
N67-22982 HC$3.00 MF$0.65

ACIDITY OF CYCLOHEXANECARBOXYLIC ACIDS, CYCLOHEXYLAMINES AND RELATED COMPOUNDS.
Eidgenossische Technische Hochschule, Zurich (Switzerland).
For primary bibliographic entry see Field 7C.
For abstract, see STAR 05 11.
N67-23014 HC$3.00 MF$0.65

THE DISPERSION CURVE FOR ROTATION VIBRATION OF A TETRAHEDRAL MOLECULE IN A FACE-CENTERED GRID WITH TETRAGONAL MOLECULAR ORIENTATION.
Dispersionskurven Fuer Rotationsschwingungen Von Tetraedrischen Molekuelen in Einem Flaech-Enzentrierten Gitter Mit Tetragonaler Molekuelorientierung
Kernforschungsanlage, Juelich (West Germany). Institut Fuer Reaktorwerkstoffe.
R. Stockmeyer. Sep 65, 28p JUL-292-RW
in German

Descriptors: *Crystal lattice, *Molecular rotation, *Thermodynamics, Algebra, Analysis, Angle, Crystal, Energy, Equilibrium, Inertia, Lattice, Matrix, Molecular, Orientation, Oscillation, Physics, Rotation, Tetrahedron, Theoretical.

For abstract, see STAR 05 11.
N67-23027 HC$3.00 MF$0.65

EFFECT OF CERTAIN ADDITIVES ON THE THERMAL DECOMPOSITION OF AMMONIUM PERCHLORATE.
National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
For primary bibliographic entry see Field 7B.
For abstract, see STAR 05 11.
N67-23401 HC$3.00 MF$0.65

X-RAY DIFFRACTION DATA ON LIQUID CARBON TETRACHLORIDE AT 25 DEGREES C.
Oak Ridge National Lab., Tenn.
M. D. Danford, A. H. Narten, and H. A. Levy. Feb 67, 25p
Contract W-7405-eng-26

Descriptors: (*Carbon tetrachloride, *X-ray diffraction analysis), Liquids, Halogenated hydrocarbons, Distribution functions, Scattering, Intensity, Tables.

For abstract, see NSA 21 09.
ORNL-4068 HC$3.00 MF$0.65

SYNTHESIS AND EVALUATION OF POLYURETHANE ELASTOMERS.
Rock Island Arsenal, Ill.
For primary bibliographic entry see Field 11I.
PB-174 535 HC$3.00 MF$0.65

ETUDE DU SOLVANT PHOSPHATE TRIBUTYLIQUE 30%-DODECANE (Study of the Tributyl Phosphate - 30 % Dodecane Solvent,
Commissariat a l'Energie Atomique, Fontenay-Aux-Roses (France). Centre d'Etudes Nucleaires.
For primary bibliographic entry see Field 18J.
PB-174 565 HC$3.00 MF$0.65

PHYSICAL PROPERTIES OF FUSED SALT MIXTURES EUTECTIC COMPOSITIONS AND MELTING POINTS. DATA FROM OPEN LITERATURE, 1963-JUNE 30, 1965. VOLUME 2,
Sandia Corp., Albuquerque, N. Mex.
Paul V. Clark, 15 Nov 66, 236p
Contract AT (29-1)-789

Descriptors: (*Salts, Mixtures), (*Fluidized bed processes, Salts), Physical properties, Melting point, Eutectics, Indexes, Statistical analysis.

For abstract, see NSA 21 09.
SC-R-65-930-Vol-2 HC$3.00 MF$0.65

7E. RADIO AND RADIATION CHEMISTRY

COSMIC RAY EXPOSURE AGES OF IRON METEORITES BY THE Ne21/Al26 METHOD.
Chicago Univ Ill Enrico Fermi Inst for Nuclear Studies
For primary bibliographic entry see Field 3A.
AD-650 655 Not available from CFSTI.

OXYGEN QUENCHING OF ACRIFLAVINE PHOSPHORESCENCE.
Doctoral thesis,
Pittsburgh Univ Pa Dept of Chemistry 39
J. L. Rosenberg, and Frederick S. Humphries. 19 Jul 66, 9p
Contract AF 19 (604)-8354, Grant NSF-GP-4268
Supported by Grant NSF-G-11309. Presented at the National Meeting of the American Chemical Society (150th), Atlantic City, N. J., Sept 1965.
Availability: Published in Journal of Physical Chemistry v71 p330-8 1967.

Descriptors: (*Anthoxanthin pigments, Phosphorescence), (*Phosphorescence, Quenching (Inhibition)), Organic nitrogen compounds, Condensation reactions, Dissociation, Reaction kinetics, Oxygen, Complex compounds, Molecular energy levels, Excitation, Dyes.
Identifiers: Acriflavines.

Neutral aqueous solutions of acriflavine (3,6-diamino-10-methylacridinium chloride) do not obey Beer's law because of the formation of dimers. The dissociation constant of the dimer at 25C was found to be 0.005 mole/l. The nonexponential decay of phosphorescence of silica gel adsorbates of acriflavine was shown to be resolvable into two first-order processes, having decay constants at 25C of 24 and 5.0/sec. These components on the gel are identified as dimer and monomer, respectively. The decay constants are independent of oxygen pressure although the phosphorescence intensity may be reduced in oxygen to less than 10%. These results are explained by a static quenching model, in which oxygen forms a relatively nonphosphorescent complex with the ground state of the dye. The formation constant of the complex was found to be 2500 or 32000/mm for the dimer or monomer, respectively. Quenching is believed to occur by an energy redistribution within the excited state of the complex followed by an escape of oxygen with an appreciable fraction of the excitation energy. There is a small probability, especially for the dimer, that the energy redistribution will not occur and that an uncomplexed dye triplet can be formed from the excited complex. (Author)
AD-650 688 Not available from CFSTI.

THE PHOTO-REACTIVITY OF AROMATIC SUBSTANCES WITH OXYGEN,
Pittsburgh Univ Pa Dept of Chemistry 39
J. L. Rosenberg, and Frederick S. Humphries. 27 Jul 64, 7p
Contract AF 19 (604)-8354, Grant NSF-G6271
Prepared for presentation at Symposium on Molecular Mechanisms in Photobiology, Wakulla Springs, Fal., Feb 16-21, 1964.
Availability: Published in Photochemistry and Photobiology v3 p343-8 1964.

Descriptors: (*Aromatic compounds, Phosphorescence), (*Anthoxanthin pigments, Phosphorescence), (*Phosphorescence, Quenching (Inhibition)), Organic nitrogen compounds, Excitation, Oxygen, Molecular energy levels, Reaction kinetics, Relaxation time, Dyes, Carbon dioxide, Catalysis.
Identifiers: Acriflavines.

The quenching reaction of oxygen with photo-excited aromatics, although almost diffusion-controlled in many cases, has some specific requirements with respect to the electronic details of the excited state. This is shown in the difference between the quenching constants for monomer and dimer of the same dye, where the dimer is recognized principally by excitation delocalization. Evidence is reviewed for the view that oxygen becomes vibrationally excited as a result of the quenching reaction, and that this hot oxygen is an essential intermediate in photo-oxidations. A new result is the stimulation of O2 quenching by CO2, a known catalyst for vibrational relaxation in O2. (Author)
AD-650 689 Not available from CFSTI.

REVERSIBLE PHOTOCHEMICAL DIMERIZATION OF ACENAPHTHYLENE. I. THE REACTION IN LIQUID SOLUTIONS,
Minnesota Univ Minneapolis Div of Physical Chemistry
Robert Livingston, and Kei Sin Wei. 5 Jul 66, 10p
AROD-2397:10
Grant DA-ARO (D)-31-124-G603
See also AD-650 760.
Availability: Published in The Journal of Physical Chemistry v71 n3 p540-7 Feb 1967.

Descriptors: (*Polycyclic compounds, *Photochemistry), Solutions, Condensation reactions, Ultraviolet radiation, Light, Molecular isomerism, Dissociation, Solvents, Temperature, Naphthalenes.
Identifiers: Acenaphthylenes, Quantum yield.

Acenaphthylene is photodimerized by visible and near-ultraviolet light. In solution, the quantum yield increases with increasing concentration and is depressed by dissolved O2. Only the cis dimer is formed in O2-saturated solutions. In O2-free solutions, both dimers are formed; the trans dimer is the dominant species in dilute solutions and the cis dimer in concentrated solutions. The effects of the nature of the solvent and of temperature were studied. The results are compatible with a relatively simple mechanism. The dimers are efficiently photodissociated, re-forming acenaphthylene. The quantum yield of photodissociation does not depend on the concentrations of dimer or of O2. (Author)
AD-650 759 Not available from CFSTI.

REVERSIBLE PHOTOCHEMICAL DIMERIZATION OF ACENAPHTHYLENE. II. THE REACTION IN THE MOLTEN AND CRYSTALLINE PHASE,
Minnesota Univ Minneapolis Div of Physical Chemistry
Kei Sin Wei, and Robert Livingston. 5 Jul 66, 5p
AROD-2397:11
Grant DA-ARO (D)-31-124-G603
See also AD-650 759.
Availability: Published in The Journal of Physical Chemistry v71 n3 p548-9 Feb 1967.

Descriptors: (*Polycyclic compounds, *Photochemistry), Crystals, Condensation reactions, Molecular isomerism, Ultraviolet radiation, Light, Polymerization, Temperature, Spectra (Visible + ultraviolet), Naphthalenes.
Identifiers: Acenaphthylenes, Fused materials, Quantum yield.

Between 0 and 25C the photodimerization of crystalline acenaphthylene is inefficient (phi < 0.005) and the only product is the trans isomer. Above 60C, the cis isomer is the dominant product, and the yield increases rapidly with increasing temperature, reaching 0.04 at 70C. Illumination of molten acenaphthylene produces both the cis dimer and a polymer. The quantum yield of dimerization is 0.20 at 90C. (Author)
AD-650 760 Not available from CFSTI.

STIMULATION OF OPTICAL EMISSIONS IN ATMOSPHERIC GASES.
Final rept., 1 Dec 61-31 Dec 66,
Utah State Univ Logan Electro-Dynamics Labs
Doran J. Baker. 30 Dec 66, 240p
AFCRL-67-0058
Contract AF 19 (628)-251

Descriptors: (*Air, Emissivity), (*Fluorescence, Atmosphere), (*Luminescence, Atmosphere), (*Infrared radiation, Atmosphere), Flames, Airglow, Aurorae, Atmosphere entry, Spectrum signatures, Exhaust gases, Guided missiles, Electron beams, Proton beams, Molecular beams, Chemiluminescence, Interferometers, Nitrogen oxides, Oxygen, Carbon monoxide, Nitrogen, Inelastic scattering, Plasma medium.

The objectives of the research were to investigate and improve knowledge in the area of energy exchange mechanisms among gases which result in radiative phenomena, particularly infrared. This includes research on fluorescent mechanisms such as electron, ion, and molecular inelastic collisions with molecules, and luminescent phenomena resulting from gas kinetic reactions. Basic questions of energy partition into kinetic or internal excitation of the products of a chemical reaction were pursued. The central purpose of this effort was to obtain a fundamental microscopic description of physical processes (such as cross sections) from which macroscopic properties directly applicable to Air Force problems can be predicted. The phenomena investigated represent the microscopic descriptions of flames, natural and artificially induced airglows, natural and artificially induced aurora, optical signatures of re-entry vehicles, and missile trails. (Author)
AD-651 017 HC$3.00 MF$0.65

MOSSBAUER EFFECT STUDIES OF SURFACE REACTIONS.
Final rept., 1 Dec 65-30 Nov 66,
Virginia Inst for Scientific Research Richmond
Melvin C. Hobson, Jr. 30 Nov 66, 14p
AFOSR-67-0923
Grant AF-AFOSR-1049-66

Descriptors: (*Mossbauer effect, Chemical reactions), (*Iron, Mossbauer effect), (*Catalysts, Mossbauer effect), Nuclear radiation spectrometers, Gamma emission, Surfaces, Catalysis, Silica gel, Reduction (Chemistry), Valence, Ammonia, Decomposition, Chemisorption.

A constant-acceleration type Mossbauer spectrometer was constructed and employed in studies concerning the chemical reactivity of surface atoms. Particular attention was given to Mossbauer effect studies of the hydrogen-reduction of supported iron catalysts. Initial results indicate the probable state of the reduced iron is a mixed ferrous-ferric oxide in the form of very small particles on the surface of the silica gel support.
AD-651 129 HC$3.00 MF$0.65

PLUTONIUM ABSTRACTS. VOLUME 6, NUMBER 11.
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
For primary bibliographic entry see Field 7D.
For abstract, see NSA 21 09.
BNWL-113-23 HC$3.00 MF$0.65

DEMONSTRATION OF THE SALT CYCLE PROCESS IN A HIGH-LEVEL RADIOCHEMICAL FACILITY,
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
W. R. Bond, G. Jansen, Jr., and L. K. Mudge. Dec 66, 77p
Contract AT (45-1)-1830

Descriptors: (*Radiochemistry, *Reactor fuels), (*Test reactors, Nuclear radiation), Plutonium, Recovery.

For abstract, see NSA 21 09.
BNWL-355 HC$3.00 MF$0.65

BASIC STUDIES IN RADIATION TECHNOLOGY,
Johnston William H. Labs., Inc., Baltimore, Md.
For primary bibliographic entry see Field 18B.
For abstract, see NSA 21 09.
JLI-2901-75 HC$3.00 MF$0.65

SYNTHESES DE L'ACIDE DELTA AMINOLEVULIQUE APPLICATION A L'INTRODUCTION DE CARBONE 14 ET DE TRITIUM (Synthesis of Delta-Aminolevulic Acid. Application to the Introduction of Carbon-14 and of Tritium).
Doctoral thesis in French,
Commissariat a l'Energie Atomique, Saclay (France). Centre d'Etudes Nucleaires.
Joel Loheac. 17 Jun 66, 74p CEA-R-3063
Text in French; Attached summary in English.

Descriptors: (*Amino acids, Synthesis (Chemistry)), (*Labeled substances, Amino acids), (*Tritiated compounds, Amino acids), Carboxylic acids, Ketones, Radioactive isotopes, Carbon, Substitution reactions, France.
Identifiers: Aminolevulinic acids.

Several new syntheses of delta-aminolevulic acid (delta-A.L.A.) were studied. 14C-4 delta-aminolevulic acid was obtained from 14C allylacetic carboxylic acid with a yield of 30 per cent with respect to barium carbonate and with a specific activity of 32 mCi/mM. The 14C-1 or 14C-2 delta-A.L.A. was prepared from the 14C-1 or 14C-2 acetate with a yield of 55 per cent with respect to the acetate. Finally the tritiated delta-A.L.A. was obtained for the first time by tritiation of ethyl phthalimidodehydralevula
te. (Author)
PB-174 564 HC$3.00 MF$0.65

ETUDE DES REACTIONS ClF3-UO2F2 ET ClO2F-UO2F2 (Study of the Reactions ClF3-UO2F2 and ClO2F-UO2F2),
Commissariat a l'Energie Atomique, Saclay (France). Centre d'Etudes Nucleaires.
For primary bibliographic entry see Field 7B.
PB-174 568 HC$3.00 MF$0.65

ETUDE DES FACTEURS PHYSICO-CHIMIQUES INTERVENANT DANS L'EXTRACTION DE L'URANIUM ET DU PLUTONIUM PAR LE PHOSPHATE DE TRIBUTYLE EN MILIEU NITRIQUE (Study of the Physico-Chemical Agents Influencing Uranium and Plutonium Extraction by Tributylphosphate in Nitric Media),
Commissariat a l'Energie Atomique, Fontenay-Aux-Roses (France). Centre d'Etudes Nucleaires.

Maurice Tarnero. Mar 67, 85p CEA-R-3206
Text in French; attached summary in English.

Descriptors: (*Uranium, Solvent extraction), (*Plutonium, Solvent extraction), (*Solvent extraction, Reviews), Organic phosphorus compounds, Phosphates, Solvents, Nitric acid, Concentration (Chemistry), Nitrates, Ions, Temperature, Additives, France.
Identifiers: Tributyl phosphates.

The following different agents are reviewed: tributylphosphate concentration, nitric acid concentration, influence of inextractable nitrates, simultaneous presence of uranium and plutonium, presence of some different ions, temperature, nature of the diluent, addition of a second active solvent (synergic or antagonistic effect), tributylphosphate and diluent degradation. (Author)
PB-174 570 HC$3.00 MF$0.65

PROCEDE CONTINU DE PRECIPITATION DES SELS DE PLUTONIUM (Continuous Precipitation Process of Plutonium Salts),
Commissariat a l'Energie Atomique, Fontenay-Aux-Roses (France). Centre d'Etudes Nucleaires.
Pierre Richard. Mar 67, 89p CEA-R-3198
Text in French; attached summary in English.

Descriptors: (*Plutonium compounds, Chemical precipitation), Salts, Oxalates, Solvent extraction, Valence, Temperature, pH, Concentration (Chemistry), Laboratory equipment, France.
Identifiers: Plutonium oxalates.

This work concerns the continuous precipitation process of plutonium oxalate. Investigations about the solubility of different valence states in nitric-oxalic and in nitric-sulfuric-oxalic medium lead to select the precipitation process of tetravalent plutonium oxalate. Settling velocity and granulometry of tetravalent oxalate plutonium were studied with variation of several precipitation parameters such as: temperature, acidity, excess of oxalic acid and aging time. Then are given test results of some laboratory continuous apparatus. Conditions of operation with adopted tubular apparatus are defined in conclusion. A flow-sheet is given for a process at industrial scale. (Author)
PB-174 576 HC$3.00 MF$0.65

SOLUBILIZATION METHOD FOR CENTIGRAM TO KILO-GRAM PLANT SAMPLES,
California Univ., Los Angeles. Lab. of Nuclear Medicine and Radiation Biology.
For primary bibliographic entry see Field 6R.
For abstract, see NSA 21 09.
UCLA-12-613 HC$3.00 MF$0.65

8. EARTH SCIENCES AND OCEANOGRAPHY

8A. BIOLOGICAL OCEANOGRAPHY

NUTRIENT REGENERATION FROM PHYTOPLANKTON DECOMPOSING IN SEA WATER.
Washington Univ Seattle Dept of Oceanography
For primary bibliographic entry see Field 8J.
AD-650 649 Not available from CFSTI.

INVESTIGATIONS OF THE MARINE ALGAE OF NOVA SCOTIA. II. SPECIES OF RHODOPHYCEAE NEW OR RARE TO NOVA SCOTIA,
National Research Council of Canada Halifax (Nova Scotia) Atlantic Regional Lab
T. Edelstein, J. McLachlan, and J. S. Craigie. 29 Aug 66, 18p
NRC-9256
See also AD-650 796, AD-650 816.
Availability: Published in Canadian Journal of Botany v45 p193-202 1967.

Descriptors: (*Algae, *Nova Scotia), Morphology (Biology), Marine biology, Identification.

Thirty-four species of Rhodophyceae are described and 25 of these are new records of Nova Scotia. A large number of these species were collected either in the sublittoral area, to a depth of 38 m, or in warm-water, salt-marsh habitats. (Author)
AD-650 795 Not available from CFSTI.

INVESTIGATIONS OF THE MARINE ALGAE OF NOVA SCOTIA. III. SPECIES OF PHAEOPHYCEAE NEW OR RARE TO NOVA SCOTIA,
National Research Council of Canada Halifax (Nova Scotia) Atlantic Regional Lab
T. Edelstein, and J. McLachlan. 29 Aug 66, 14p
NRC-9255
See also AD-650 795, AD-650 816.
Availability: Published in Canadian Journal of Botany v45 p203-10 1967.

Descriptors: (*Algae, *Nova Scotia), Morphology (Biology), Marine biology, Identification.

Twenty-nine species of Phaeophyceae are described, and 25 of these are new records for Nova Scotia. Six species are new to North America: Feldmania irregularis (Kutzing) Hamel, Mikrosyphar polysiphonia Kuckuck, Phloeospora curta (Foslie) Jaasund, Sphacelaria saxatilis (Kuckuck) Sauvageau, Streblonema immersum Levring, and S. tenuissimum Hauck. (Author)
AD-650 796 Not available from CFSTI.

THE HISTORY OF THE BLIND SPERM WHALE,
Foreign Technology Div Wright-Patterson AFB Ohio
A. G. Tomilin. 5 Dec 66, 212p Rept no. FTD-HT-66-434
TT-67-61604
Unedited rough draft trans. of mono. Isteriya Slepogo Kashalota, Moscow, 1965 191p.

Descriptors: (*Cetacea, *Marine biology), Physiology, Behavior, Distribution, History, Learning, Sensory perception, Marine biological noise, Ingestion (Physiology), Echo ranging.

The report is devoted to whales, which include Dolphins, Sperm Whales, Narwhal, Belugas, Killer Whales, and Baleen Whales. It discusses the distribution of these animals through oceans, their bodily structure, their biological peculiarities, the use of the products of the whaling industry in different branches of industry, and also the keeping of certain whales in captivity. The newest discoveries in the region of the biology of whales and dolphins are reflected. (Author)
AD-650 803 HC$3.00 MF$0.65

INVESTIGATIONS OF THE MARINE ALGAE OF NOVA SCOTIA. IV. SPECIES OF CHLOROPHYCEAE NEW OR RARE TO NOVA SCOTIA,
National Research Council of Canada Halifax (Nova Scotia) Atlantic Regional Lab
T. Edelstein, and J. McLachlan. 29 Aug 66, 5p
NRC-9257
See also AD-650 795, AD-650 796.
Availability: Published in Canadian Journal of Botany v45 p211-14 1967.

Descriptors: (*Algae, *Nova Scotia), Morphology (Biology), Marine biology, Identification.

Thirteen species of Chlorophyceae are described, and 12 are new records for Nova Scotia. Pseudopringsheimia confluens (Rosenv.) Wille has been recorded only in Greenland. (Author)
AD-650 816 Not available from CFSTI.

A STRONG, SEASONAL BIO-ACOUSTIC SOURCE OF THE EASTERN CARIBBEAN.
Technical rept.,
Columbia Univ Dobbs Ferry N Y Hudson Labs
Winston L. Hole. Feb 67, 44p Rept no. TR-133
Contract Nonr-266 (84)

Descriptors: (*Underwater sound signals, Sources), Marine biological noise, Cetacea, Acoustics, Caribbean Sea, Periodic variations, Superlow frequency.

Bio-acoustic pulse trains heard annually from January to March in the Lesser Antilles region and northward were studied. Pulses lasting from about 50 to 150 msec are emitted at a rate of 1 to 5 per sec for durations up to 2 min. Recordings in the frequency band to 300 Hz with bottomed hydrophones how a principal frequency in the range of either 160 to 190 Hz or 260 to 300 Hz at low or high repetition rates, respectively, and a peak power in the order of 40 to 150 W. Arrival time differences at a grid of four hydrophones have been used with a computer program to calculate source locations and, with certain assumptions, their kinematics. Of 37 locations so calculated, about half are at the surface and the rest at depths to 6600 ft. Mean speeds between locations of successive recordings are mostly in the range 1 plus or minus 0.5 knot. The identity of the source is unknown, but is a question of continuing interest. Analysis of these acoustic data suggests a balaenopterid whale as the most likely possiblity. (Author)
AD-650 852 HC$3.00 MF$0.65

NET ZOOPLANKTON DATA FROM THE NORTHEAST PACIFIC OCEAN: COLUMBIA RIVER EFFLUENT AREA, 1961, 1962.
Technical rept.,
Washington Univ Seattle Dept of Oceanography
Willis K. Peterson, and George C. Anderson. Nov 66, 233p Rept no. TR-160, Ref-M66-71
RLO-1725-82
Contracts Nonr-477 (10), Nonr-477 (37)
Prepared in cooperation with AEC, Contracts AT (45-1)-1385, AT (45-1)-1725.

Descriptors: (*Plankton, Pacific Ocean), Rivers, Washington (State), Oregon, Periodic variations, Distribution, Abundance, Identification, Seacoast.
Identifiers: Columbia River.

The report contains tabulations of net zooplankton data from 434 quantitative samples collected during 1961 and 1962 on the Research Vessel Brown Bear off the Washington and Oregon coasts. The samples were collected in key areas in and around the Columbia River effluent to provide a description of seasonal variations of distribution and abundance of plankton associated with changes in the discharge of river water. Identification and enumeration of copepods was stressed. (Author)
AD-651 075 HC$3.00 MF$0.65

DEEP-OCEAN BIODETERIORATION OF MATERIALS. PART VI. ONE YEAR AT 2,370 FEET.
Naval Civil Engineering Lab Port Hueneme Calif
For primary bibliographic entry see Field 13J.
AD-651 124 HC$3.00 MF$0.65

PACIFIC NORTHWEST LABORATORY ANNUAL REPORT FOR 1965 IN THE BIOLOGICAL SCIENCES,
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
For primary bibliographic entry see Field 6R.
For abstract, see NSA 21 09.
BNWL-280 HC$3.00 MF$0.65

8B. CARTOGRAPHY

TIROS CLOUD FREE ATLAS: NORTH AMERICA CENTRAL UNITED STATES SPRING SEASON,
Bohan (Walter A.) Co., Park Ridge, Ill.
For primary bibliographic entry see Field 4B.
PB-174 610 HC$3.00 MF$0.65

TIROS CLOUD FREE ATLAS: NORTH AMERICA EASTERN UNITED STATES SPRING SEASON,
Bohan (Walter A.) Co., Park Ridge, Ill.
For primary bibliographic entry see Field 4B.
PB-174 611 HC$3.00 MF$0.65

TIROS CLOUD FREE ATLAS: NORTH AMERICA WESTERN UNITED STATES SPRING SEASON,
Bohan (Walter A.) Co., Park Ridge, Ill.
For primary bibliographic entry see Field 4B.
PB-174 612 HC$3.00 MF$0.65

8C. DYNAMIC OCEANOGRAPHY

THE INFLUENCE OF VARIABLE DEPTH ON STEADY ZONAL BAROTROPIC FLOW,
Washington Univ Seattle Dept of Oceanography
Gene H. Porter, and Maurice Rattray, Jr. Apr 64, 12p Rept no. Contrib-319
Contract Nonr-477 (10), Grant NSF-GP-1101
Availability: Published in Deutschen Hydrographischen Zeitschrift v17 n4 p164-74 1964.

Descriptors: (*Ocean currents, Ocean bottom topography), Ocean waves, Bathythermograph data, Vortices, Equations.

Solutions are obtained in frictionless, steady barotropic flow for the effect of simple bathymetric features on an initially uniform zonal current. For flow towards the west, an infinitely long ridge or valley causes an infinite streamline deflection while for flow towards the east, either an infinite deflection or a stationary Rossby wave pattern may occur. Several examples are given which illustrate the behavior of these waves. (Author)
AD-650 646 Not available from CFSTI.

OCEANOGRAPHIC ATLAS OF THE NORTH ATLANTIC OCEAN. SECTION VI. SOUND VELOCITY.
Naval Oceanographic Office Washington D C
For primary bibliographic entry see Field 8J.
AD-650 880 Not available from CFSTI.

DEUTERIUM AND OXYGEN 18 VARIATIONS IN THE OCEAN AND THE MARINE ATMOSPHERE,
Scripps Institution of Oceanography La Jolla Calif
H. Craig, and L. I. Gordon. 14 Apr 67, 124p
Contract Nonr-2216 (23)
Availability: Published in Consiglio Nazionale Delle Richerche Laboratorio Di Geologia Nucleare Pisa p1-122 Jul 26-30 1965.

Descriptors: (*Sea water, Isotopes), (*Marine meteorology, Isotopes), (*Deuterium, Oceanology), (*Oxygen, Oceanology), Hydrogen, Abundance, Tracer studies, Interfaces, Atmosphere, Evapotranspiration, Atmospheric precipitation, Deep water, Freezing, Shallow water, Salinity, Ice, Ocean waves, Moisture, Tritium.

The paper describes the experimental and theoretical results we have obtained in our study of the variations of the hydrogen and oxygen isotopic abundances in the sea and the atmosphere. The varying proportions of these molecules in sea water provide an oceanographic tracer like salinity, but with an extra degree of freedom: salt is a tracer for the oceanic fluid, but the isotopic composition is a tracer specifically for the water component of the fluid. Emphasis is placed on the oxygen 18 variations because of the direct relationship to paleotemperature studies which require a knowledge of the oxygen isotope variations in the sea in space and time. The work on deuterium was principally on understanding the ocean-atmosphere exchange of water and both isotopic species are discussed in this context.
AD-650 965 Not available from CFSTI.

A COMPILATION OF MOORED CURRENT METER OBSERVATIONS. VOLUME II.
Technical rept.,
Woods Hole Oceanographic Institution Mass
Ferris Webster, and Nicholas P. Fofonoff. Nov 66, 102p Rept no. WHOI-Ref-66-60
Contracts Nonr-3351 (00), Nonr-2196 (00)
See also AD-624 815.

Descriptors: (*Ocean currents, Measurement), Bermuda, Oceanographic equipment, Mooring buoys, Oceanographic data, Maps, Data processing systems.

Summaries of current measurements made with Richardson current meters at a group of moored stations near Bermuda, and at a single station south of Bermuda are presented. Averaged quantities are presented in the form of computer-plotted curves. (Author)
AD-651 112 HC$3.00 MF$0.65

A METER TO MEASURE FREQUENCIES BELOW 1 KC/S.
Weapons Research Establishment, Salisbury (Australia).
J. Keen. Sep 66, 15p WRE-ISD-73

Descriptors: *Frequency measurement, *Liquid flow, *Measuring apparatus, *Oceanography, Apparatus, Circuit, Error, Flow, Flow meter, Frequency, Instrumentation, Liquid, Measurement, Measuring, Temperature, Voltage.

For abstract, see STAR 05 11.
N67-23098 HC$3.00 MF$0.65

8D. GEOCHEMISTRY

THE ORIGIN OF MANGANESE NODULES ON THE OCEAN FLOOR,
Washington Univ Seattle Dept of Oceanography
Enrico Bonatti, and Y. Rammohanroy Nayudu.
1965, 24p Rept no. Contrib-336
Contract Nonr-477 (10)
Prepared in cooperation with Scripps Institution of Oceanography, La Jolla, Calif. Research supported in part by AEC, NSF, and American Chemical Society's Petroleum Research Fund.
Availability: Published in American Journal of Science v263 p17-39 Jan 1965.

Descriptors: (*Manganese, *Ocean bottom), Minerals, Iron compounds, Ores (Metal sources), Petrology, Igneous rock, Sea water, Chemical precipitation, Volcanoes.

Ferromanganese oxide minerals are among the most common components of large areas of the ocean floor. Their chemical and mineralogical peculiarities have long stimulated considerable interest. A brief review of various theories on the origin of these minerals is presented. Petrologic studies of some of the manganese nodules from the Pacific Ocean are reported, which show the existence in the nodules of a close association between ferromanganese oxide phases and products of submarine volcanic effusions. Such an association can be explained admitting some genetical connection between deep-sea lava effusions and the nodules. These results, together with observations on their distribution and chemistry, do not seem to agree with the hypothesis which assumes a slow accretion of the nodules, owing to chemical deposition of manganese and related elements from normal sea water. It is instead suggested that the majority of manganese nodules from the Pacific Ocean bottom are formed as a consequence of submarine volcanism. Strong interaction between hot lavas and sea water takes place in many submarine volcanic effusions. As a result large quantities of iron, manganese, and other elements are leached out of the lava. Manganese is partially separated from iron, and the bulk of it is then precipitated on the ocean floor in the vicinity of the effusion, thus forming the nodules. Some geochemical implications of this hypothesis are also discussed briefly. (Author)
AD-650 647 Not available from CFSTI.

PALAGONITE TUFFS (HYALOCLASTITES) AND THE PRODUCTS OF POST-ERUPTIVE PROCESSES,
Washington Univ Seattle Dept of Oceanography
For primary bibliographic entry see Field 8J.
AD-650 648 Not available from CFSTI.

THE SPECTROPHOTOMETRIC DETERMINATION OF AMMONIA AND LABILE AMINO COMPOUNDS IN FRESH AND SEAWATER BY OXIDATION TO NITRITE.
Master's thesis,
Washington Univ Seattle Dept of Oceanography
Francis A. Richards, and Richard A. Kletsch. 23 Dec 63, 19p Rept no. Contrib-307
Contract Nonr-477 (10), Grant NSF-G-19784
Availability: Published in Recent Researches in the Fields of Hydrosphere Atmosphere and Nuclear Geochemistry p65-81 1964.

Descriptors: (*Sea water, Nitrogen compounds), (*Water, Nitrogen compounds), (*Ammonia, Microanalysis), (*Amines, Microanalysis), Oxidation, Nitrites, Spectroscopy, Colorimetric analysis, Amino acids, Urea.

A new method was developed for the determination of small concentrations of ammonia and labile amino compounds in distilled, fresh, and seawater. It employs the oxidation of these compounds to nitrite by sodium hypochlorite in strongly basic solution. The excess sodium hypochlorite is reduced with sodium arsenite solution, and the nitrite is then determined by a colorimetric method. Bromide and iodide ions catalyze the oxidation. The precipitation of calcium and magnesium hydroxide from seawater samples by the base does not interfere with the determination. Concentrations as low as 1 micrograms NH4 (+)-N/l can be detected. The average standard deviation is plus or minus 3 micrograms NH4 (+)-N/l at the level of 100 micrograms NH4 (+)-N/l in sea water. The comparable average standard deviation is plus or minus 1.1 micrograms in distilled water. On the average, 73% of the ammonia is converted to nitrite. Of six amino acids investigated, 12 to 67% of their amino nitrogen was converted to nitrite. The present method is compared with the vacuum distillation method of Riley and Riley and Shinhaseni. (Author)
AD-650 650 Not available from CFSTI.

COMPILATION OF REPRINTS.
Technical repts.,
Oregon State Univ Corvallis Dept of Oceanography
R. M. Pytkowicz, I. W. Duedall, D. R. Kester, Peter K. Weyl, and Gunnar Bodvarsson. Jan 67, 51p Rept no. TR-79-82
Contract Nonr-1286 (10)
Research supported in part by NSF.
Availability: Published in various journals.

Descriptors: (*Oceanology, Reports), (*Magnesium, Sea water), (*Sea water, *pH), Oceans, Environment, Chemical equilibrium, Geophysics, Ex-

perimental data, Mathematical prediction, Linear systems, Transformations (Mathematics).

Contents: Magnesium ions: Activity in seawater; Reproducibility of pH measurements in seawater; Environmental stability of the earth's surface chemical consideration; Direct interpretation methods in applied geophysics. (Author)
AD-650 725 Not available from CFSTI.

THERMAL PROPERTIES OF AMPHIBOLES AS A FUNCTION OF ALKALI CONTENT.
Research trans.,
American Meteorological Society Boston Mass
A. F. Korzhinskii. Feb 67, 9p Rept no. T-R-634
TT-67-61619
Contract AF 19 (628)-3880
O Zavisimosti Termicheshikh Svoistv Amfibolov ot Soderzhaniya v Nikh Shchelochei, trans. of Akademiya Nauk SSSR. Doklady, v111 n2 p445-7 1956.

Descriptors: (*Rock forming minerals, Thermal properties), (*Alkali metals, Rock forming minerals), Heating, Dehydration, Differential thermal analysis, Sintering, Melting, Optical properties, Concentration (Chemistry), Iron, USSR.
Identifiers: Amphiboles.

Some authors hold that amphiboles also contain zeolitic water that is given off in the 400-500C range, which creates a corresponding additional endothermal effect in the temperature diagram. Optical pyrometer studies of 24 specimens of amphiboles of various compositions did not show the presence of zeolitic water in even a single case. The result of these studies of different amphiboles (tremolite-actinolite series, nephrites, common hornblendes, pargasite, and arfvedsonite) was to establish that their thermal properties are largely a function of alkali content. (Author)
AD-650 878 HC$3.00 MF$0.65

THE CONTRIBUTION OF UNRECOGNIZED MINERAL PRECIPITATES OF MARINE ORGANISMS TO MARINE SEDIMENTS.
California Inst. of Tech., Pasadena.
For primary bibliographic entry see Field 8G.
PB-174 381 HC$3.00 MF$0.65

8E. GEODESY

THE DISTRIBUTION OF GE IN THE METALLIC PHASES OF SOME IRON METEORITES.
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
J. I. Goldstein. Mar 67, 27p NASA-TM-X-55736, X-641-67-92

Descriptors: *Atom concentration, *Germanium, *Iron meteorite, Atom, Coefficient, Concentration, Distribution, Electron, Iron, Metal, Meteorite, Microanalysis, Nickel, Phase, Probe.

For abstract, see STAR 05 11.
N67-22074 HC$3.00 MF$0.65

8F. GEOGRAPHY

EL REAL ENVIRONMENTAL SURVEY DARIEN PROVINCE, REPUBLIC OF PANAMA, 1962.
Wilson Nuttall Raimond Engineers Inc Chestertown Md
L. R. Holdridge, J. A. Duke, W. A. Finch, W. C. Grenke, and H. Hennsey. Jan 64, 345p
TRECOM-TR-63-72
Contract DA-44-177-TC-393
See also AD-631 733.

Descriptors: (*Geography, Panama), (*Tropical regions, Environment), Ecology, Terrain, Soils, Vehicles, Mobility, Hydrographic surveying, Geology, Plants (Botany), Climatology, Trafficability, Transportation, Soil mechanics, Weather stations.

The Environmental Survey was conducted in Darien Province, Panama, within a 32 kilometer radius of the village of El Real. The primary objective was to establish a comprehensive body of correlated data on significant environmental factors that affect mobility in the survey area. Field operations were conducted between 15 June and 18 August, 1962, by an 11-man team of scientists and technicians from several United States and Panamanian agencies. Environmental studies covered (1) ecology, (2) soils, (3) hydrography, (4) physiography, (5) geology, (6) botany, and (7) climatology. (Author)
AD-650 762 HC$3.00 MF$0.65

RESETTLEMENT IN LATIN AMERICA: AN ANALYSIS OF 35 CASES.
American Univ Washington D C Center for Research in Social Systems
For primary bibliographic entry see Field 5A.
AD-651 116 HC$3.00 MF$0.65

ESTUARIES.
Michigan State Univ Hickory Corners W K Kellogg Biological Station
For primary bibliographic entry see Field 8H.
AD-651 162 Not available from CFSTI.

ANTARCTICA COMMISSION REPORTS 1963.
Israel Program for Scientific Translations, Ltd., Jerusalem.
For primary bibliographic entry see Field 8G.
For abstract, see STAR 05 11.
N67-22341 HC$3.00 MF$0.65

8G. GEOLOGY AND MINERALOGY

EXTENSION OF NORTHEASTERN-PACIFIC FRACTURE ZONES.
Scripps Institution of Oceanography La Jolla Calif
For primary bibliographic entry see Field 8J.
AD-650 660 Not available from CFSTI.

LOWER CRETACEOUS ROCKS (NEOCOMIAN-ALBIAN) DREDGED FROM BLAKE ESCARPMENT.
Lamont Geological Observatory Palisades N Y
Bruce C. Heezen, and Robert E. Sheridan. 20 Oct 66, 3p Rept no. Contrib-1009
Contract Nonr-266 (48), Grant NSF-GA-580
Availability: Published in Science v154 n3757 p1644-7 Dec 30 1966.

Descriptors: (*Geologic age determination, *Rock (Geology)), Deep water, Carbonates, Stratigraphy, Deposits, Algae, Coral reefs, Ocean bottom sampling, Minerals, Foraminifera, Sedimentation, Refraction, Seismic waves, Reflection, Bahama Islands, Florida.

Algal calcarenites, Neocomian to Aptian in age, dredged from 3000- to 5000-meter depth on Blake Escarpment, are the oldest rocks yet obtained from deep-sea outcrops. Five thousand meters of post-Aptian subsidence of the Blake Plateau is thus established. Aptian-Albian calcilutites obtained from depths of less than 3000 meters mark the establishment of an offshore environment. (Author)
AD-650 677 Not available from CFSTI.

SEDIMENTS OF THE CAICOS OUTER RIDGE, THE BAHAMAS.
Lamont Geological Observatory Palisades N Y
Eric D. Schneider, and Bruce C. Heezen. 5 Apr 65, 21p Rept no. Contrib-1005
Contract Nonr-266 (48), Grant NSF-GA-580
Research supported in part by Bell Telephone Labs.
Availability: Published in Geological Society of America Bulletin v77 p1381-98 Dec 1966.

Descriptors: (*Sedimentation, *Bahama Islands), Sedimentary rock, Foraminifera, Clay minerals, Carbonates, Ocean currents, X-ray diffraction analysis, Ocean bottom, Stratigraphy, Deposits.

Northeast of Caicos Island (Bahamas) a large sedimentary ridge rises from the deep sea floor. This asymmetrical ridge is steepest on the south side and lies parallel to the Bahama Banks. Four 6-m-long cores taken from 2850 to 2900 fathoms consist predominantly of pelagic clays (illite and chlorite); they contain interbedded calcarenites which consist of foraminifera, pteropods from both neritic and littoral depths and finer material. A single stratigraphic sequence is seen in the four cores. Each core exhibits similar variation in carbonate content, similar sequence of manganese-stained layers, and a similar sequence of sediment colors. The Caicos Outer Ridge consists predominantly of clays evidently deposited by a southeasterly flowing deep ocean current. Incorporated in this lutite ridge are calcarenites whi originated on the Bahama Banks and spread along the ridge and onto the surrounding abyssal plains. (Author)
AD-650 679 Not available from CFSTI.

AN EOCENE DREDGE HAUL FROM THE TUAMONTU RIDGE.
Lamont Geological Observatory Palisades N Y
Lloyd H. Burckle, and Tsunemasa Saito. 1966, 2p Rept no. Contrib-921
Contract Nonr-266 (28), Grant NSF-GA-580
Availability: Published in Deep-Sea Research v13 p1207-8 1966.

Descriptors: (*Geologic age determination, *Boulders), Sedimentation, Sand, Ocean bottom sampling, Silt, Foraminifera, Shallow water, Algae, Sedimentary rock, Pacific Ocean.

Middle- and Upper-Eocene boulders representing shallow- and deep-water facies were dredged from the southwest flank of the Tuamotu Ridge at 14 deg. 29 min S and 150 deg. 1 min W. The dredging suggests that rapid subsidence occurred during upper Middle Eocene time in this portion of the Ridge. Lithification and the presence of bore holes caused by littoral organisms in the Upper-Eocene boulders further indicate that uplift took place in post-Eocene time. (Author)
AD-650 680 Not available from CFSTI.

DEEP-SEA IRON DEPOSIT FROM THE SOUTH PACIFIC.
Miami Univ Fla Inst of Marine Science 1004
Enrico Bonatti, and Oiva Joensuu. 18 Aug 66, 4p Rept no. Contrib-741
Contract Nonr-4008 (02), Grant NSF-GP-2455
Availability: Published in Science v154 n3749 p643-5 Nov 4 1966.

Descriptors: (*Iron, *Deposits), (*Oceanology, Pacific Ocean), Ocean bottom, Basalt, Manganese compounds, Oxides, Deep water, Volcanoes, Spectroscopy, Quantitative analysis.

Along with specimens of manganese oxides and basalt, rocks containing more than 30 percent iron by weight and consisting mainly of poorly crystallized goethite have been dredged from the flanks of a seamount located on the East Pacific Rise. The Fe-Mn ratio varies widely among the various oxide rocks deposited at this locality and at another seamount in the same area. The deposit was probably formed by fractional precipitation of iron and manganese which had been introduced locally into the bottom water by hydrothermal solutions of volcanic origin, and by leaching from deep-sea basaltic lavas. (Author)
AD-650 695 Not available from CFSTI.

DEEP-SEA AUTHIGENIC CALCITE AND DOLOMITE.
Miami Univ Fla Inst of Marine Science 1004
Enrico Bonatti. 3 May 66, 4p Rept no. Contrib-704
Contract Nonr-4008 (02), Grant NSF-GP-2455
Availability: Published in Science v153 n3735 p534-7 Jul 29 1966.

Descriptors: (*Calcite, *Pacific Ocean), (*Clay minerals, *Ocean bottom), Electron diffraction analysis, Electron microscopy, Deep water, Carbonates, Single crystals, Volumetric analysis, Sedimentation, Photomicrography.

Crystals of calcite and, in one case, of dolomite up to 90 millimicron in size are dispersed in pelagic red clay at several sites on the floor of the South Pacific Ocean. They were analyzed by microscopic, x-ray diffraction, electron x-ray microprobe, and oxygen isotopic techniques. These carbonates are authigenic and were probably precipitated from hydrothermal solutions connected with deep-sea volcanic activity. (Author)
AD-650 696 Not available from CFSTI.

A TUBULAR SPRING VALVE USED AS A TIGHT AND THIN-WALLED CORE-RETAINER.
Scripps Institution of Oceanography La Jolla Calif
Andre M. Rosfelder. 21 Mar 66, 5p
Contract Nonr-2216 (23)
Availability: Published in Journal of Sedimentary Petrology v36 n4 p973-6 Dec 1966.

Descriptors: (*Valves, *Well logging), Springs, Textiles, Pipes.

A thin-walled and tight core-retainer, which can be used also as a quick-acting valve for various purposes, was built in different models and successfully tested at sea. It is based on a cloth valve originally adapted to corers by H. Delauze, but twisted in this device, by an encasing torsion spring released by a latch. This latch is directly actuated by the sediment during the pull-up. (Author)
AD-650 723 Not available from CFSTI.

THE THERMODYNAMIC PROPERTIES OF THE ALUMINUM SILICATES.
Revised ed.,
Chicago Univ Ill
J. L. Holm, and O. J. Kleppa. 27 Apr 66, 19p
AROD-5107-5
Grant DA-ARO (D)-31-124-G616
Revision of manuscript submitted 9 Mar 66. Research supported in part by ARPA and NONR.
Availability: Published in American Mineralogist v51 p1608-22 Nov/Dec 1966.

Descriptors: (*Minerals, Thermodynamics), (*Aluminum compounds, Thermodynamics), (*Silicates, Thermodynamics), Heat of formation, Calorimetry, Phase diagrams, Entropy, Pressure, Temperature.
Identifiers: Aluminum silicates, Andalusite, Kyanite, Mullite, Sillmanite.

The heats of formation, from the oxides, of the three polymorphs of Al2SiO5 (kyanite, andalusite and sillimanite) and of mullite, 3Al2O3.2SiO2, were measured by oxide melt solution calorimetry at 968K. Al2O3 alpha + SiO2 = kyanite: -2.37 kcal/mole; Al2O3 alpha + SiO2 = andalusite: -1.99 kcal/mole; Al2O3 alpha + SiO2 = sillimanite: -1.51 kcal/mole; 3Al2O3 alpha + 2SiO2 = mullite: +5.44 kcal/mole. On the basis of these results, and of entropy, heat content and volume data taken from the literature, the P-T diagram for the Al2O3-SiO2 system was calculated for a wide range of temperatures and pressures. This diagram is in reasonable agreement with recent high temperature-high pressure experimental work and with some data based on direct geological observations. (Author)
AD-650 749 Not available from CFSTI.

TECTONICS OF THE PAMIRS AND TIEN SHAN.
Technical trans.,
Aeronautical Chart and Information Center St Louis Mo Linguistic Section
A. V. Peive, I. E. Gubin, and R. G. Garetskii.
Apr 67, 322p
TT-67-61630, ACIC-TC-1090
Tektonika Pamira i Tyan-Shanya, Trans. of Tectonic Conference of the USSR (no. 2), Dushambe. Proceedings, Moscow, 1964 217.

Descriptors: (*Mountains, *Structural geology), Orogeny, Stratigraphy, Rock (Geology), Petroleum, Deposits, Folds (Geology), Faults (Geology), Asia, USSR, China, Afghanistan, Seismology.
Identifiers: Pamir Mountains, Tein Shan, Tectonics.

Contents: Tectonics of the Pamirs; Structural-facies subzones of the central and southeastern pamirs; Tectonic distribution of granitoid instrusions of the Pamirs (basic principles); The main tectonic line of the pamirs; The specific features of the history of development of the pamirs in alpine time, and its present tectonic structure; The tectonic nature of the western part of the pamirs-himalaya-kunlun neotectonic uplift; Tectonics of the centralasiatic intermountain areas in connection with their oil and gas contents; The Verkhne (Upper)-Amu Darya depression as an example of an activated platform in connection with problems of oil and gas contents; Certain features of the tectonics of the tadzhik depression in connection with oil and gas contents; Certain characteristics of the abyssal tectonics of the Tadzhik depression, according to geophysical data; On the problem of the tectonic structure of Fergana and the laws governing the distribution of folds in Mesozoic and Cenozoic deposits; Basic features of the abyssal geological structure of the eastern part of the Fergana depression, according to data of geophysical research; Nuclei and internuclear zones of middle Asia as basis of its geological zonation; Tectonic zonation of the Gissar-Alai (Southern Tien Shan) folded area in the hercynian structure; Basic formation stages of the western part of Tien Shan (Central Tadzhikistan) paleozoic geosyncline; The Northern Tien Shan fracture.
AD-650 765 HC$3.00 MF$0.65

THERMAL PROPERTIES OF AMPHIBOLES AS A FUNCTION OF ALKALI CONTENT.
American Meteorological Society Boston Mass
For primary bibliographic entry see Field 8D.
AD-650 878 HC$3.00 MF$0.65

SOME RESULTS OF MAGNETOTELLURIC SOUNDING IN THE IRKUTSK AMPHITHEATER.
Directorate of Scientific Information Services Ottawa (Ontario)
For primary bibliographic entry see Field 8N.
AD-650 885 HC$3.00 MF$0.65

ANTARCTICA COMMISSION REPORTS 1963.
Israel Program for Scientific Translations, Ltd., Jerusalem.
V. A. Bugaev. 1966, 206p TT-65-50143
Transl. into English of the Book "antarktika Doklady Komissii 1963" Moscow, Izd. Nauka, 1964
Published for Nsf

Descriptors: *Antarctica, *Geography, *Geology, *Petrology, *Topography, Acclimatization, Chemistry, Formation, Glacier, Platform, Rock, Tectonics, Temperature, U.S.S.R., Water, Zone.

For abstract, see STAR 05 11.
N67-22341 HC$3.00 MF$0.65

THE CONTRIBUTION OF UNRECOGNIZED MINERAL PRECIPITATES OF MARINE ORGANISMS TO MARINE SEDIMENTS.
Terminal rept.
California Inst. of Tech., Pasadena.
1967, 6p
Grant NSF-GP-321

Descriptors: (*Marine geology, *Sedimentation), (*Minerals, Sedimentation), Magnetite, Aquatic animals, X-ray diffraction analysis, Ocean bottom sampling, Iron compounds, Teeth, Mollusca, Carbonate minerals, Calcite, Skeleton, Aragonite, Strontium, Calcium, Chemical precipitation, Geochemistry.

The results of our biogeochemical studies of the crystalline compounds from mineralized tissues of marine organisms are as follows: The discovery of the mineral, magnetite, as a biologic precipitate was reported. The question whether magnetite is directly precipitated by the organisms was investigated. The X-ray diffraction patterns of this mineral were shown to be identical to the iron micelles of ferritin, which is a ferric oxide mineral. The study shows that glassy ferric oxide minerals are found in two other classes of marine invertebrates. Considering the carbonate minerals, routine determinations of the polymorphs by means of X-ray diffraction has materially extended our previous knowledge of the distribution of calcite and aragonite. Earlier studies have shown that the Bivalvia and other higher Mollusca discriminate strongly in their biochemistry against Sr relative to Ca as compared to the Sr/Ca ratio in sea water. The Sr and Mg contents of the calcites and aragonites in samples from class related species were found to be similar. In the calcites, the phyla distribution of the Sr/Ca ratios were shown to be similar to those in the aragonites. (Author)
PB-174 381 HC$3.00 MF$0.65

NATIONAL SCIENCE FOUNDATION SHIP SUPPORT FOR 1964-65.
Alaska Univ., College. Inst. of Marine Science.
For primary bibliographic entry see Field 8H.
PB-174 523 HC$3.00 MF$0.65

SITE-SELECTION INVESTIGATIONS. PROJECT PRE-GONDOLA,
Army Engineer Nuclear Cratering Group, Livermore, Calif.
For primary bibliographic entry see Field 18C.
For abstract, see NSA 21 09.
PNE-1101 HC$3.00 MF$0.65

MACRODEFORMATION RESULTING FROM THE HANDCAR EVENT,
California Univ., Livermore. Lawrence Radiation Lab.
Charles R. Boardman, G. Lewis Meyer, and David D. Rabb. 1 Dec 66, 54p
Contract W-7405-eng-48

Descriptors: (*Nuclear explosions, *Rock (Geology)), (*Fracture (Mechanics), Detonations), Deformation.

For abstract, see NSA 21 09.
UCRL-50149 HC$3.00 MF$0.65

8H. HYDROLOGY AND LIMNOLOGY

THE SPECTROPHOTOMETRIC DETERMINATION OF AMMONIA AND LABILE AMINO COMPOUNDS IN FRESH AND SEAWATER BY OXIDATION TO NITRITE.
Washington Univ Seattle Dept of Oceanography
For primary bibliographic entry see Field 8D.
AD-650 650 Not available from CFSTI.

COMPILATION OF REPRINTS.
Oregon State Univ Corvallis Dept of Oceanography

For primary bibliographic entry see Field 8D.
AD-650 725 Not available from CFSTI.

INTERRELATION OF PHYTOPLANKTON AND SAPROPHYTE BACTERIA IN A RESERVOIR,
Foreign Technology Div Wright-Patterson AFB Ohio
K. A. Guseva. 7 Mar 67, 12p Rept no. FTD-HT-66-231
TT-67-61602
Vzaimootnosheniya Fitoplanktona i Saprofitnykh Bakterii v Vodoeme, unedited rough draft trans. of Akademiya Nauk SSSR. Zoologicheskii Institut. Trudy, n1 p34-8 1951.

Descriptors: (*Plankton, Antibiotics), (*Bacteria, Water supplies), Dams, Growth, Microbiology, Algae, Germicides, Bacteriophages, Toxicity, USSR.

The relation of phytoplankton to bacteria is investigated. With the development of phytoplankton the development of bacteria is retarded. It is assumed that plankton acts toxically on bacteria. The question is raised as to whether algae give off antibiotic substances, toxic to saprophytic bacteria. The data show that in living plankton bacteria do not develop well. Phytoplankton and zooplankton are differentiated. With a decrease in plankton and in water filtered by a membrane, bacteria do grow well. The summer season has much to do with this. The different types of food necessary for bacteria and algae are cited. Data about bacteria in reservoirs without plankton and algae are also given. (Author)
AD-650 805 HC$3.00 MF$0.65

ESTUARIES,
Michigan State Univ Hickory Corners W K Kellogg Biological Station
George H. Lauff. 1967, 769p
Availability: Hard copy available from American Association for the Advancement of Science, Washington, D. C., Pub-83. $27.00.

Descriptors: (*Estuaries, *Hydrology), (*Geography, *Biology), Oceanology, Sea water, Norway, Africa, Tides, Fishes, Food, River currents, Swamps, Geology, Chemistry, Salinity Motion, Water pollution, Sedimentation, Continental shelves.

Need for a more comprehensive understanding of estuaries and their surroundings and the lack of an adequate means to exchange information concerning estuarine research stimulated the organization of the Conference on Estuaries, held at Jekyll Island, Georgia, from March 31 to April 3, 1964. The objectives were to provide an opportunity for the exchange of ideas between the various disciplines and individuals interested in estuarine research, to summarize the present knowledge of the natural characteristics of estuaries, and to delineate the direction of current research efforts. This book is an outcome of the Conference. The subject matter is broad, and includes aspects of biology, chemistry, geography, geology, and physics. There is as yet no name like oceanography or limnology for estuarine research and its future strength lies, perhaps, in the diversity of disciplines which can contribute to it without the hindrance of established patterns and procedures.
AD-651 162 Not available from CFSTI.

REMOTE SENSING BY INFRARED AND MICROWAVE RADIOMETRY. I. BASIC PRINCIPLES. II. A TECHNIQUE FOR THE CORRECTION OF AIRBORNE MEASUREMENTS OF APPARENT SURFACE TEMPERATURE OF NATURAL WATER BODIES. III. POTENTIAL APPLICATIONS OF INFRARED AND MICROWAVE RADIOMETRY.
Wisconsin Univ Madison Dept of Meteorology
For primary bibliographic entry see Field 14B.
AD-651 188 HC$3.00 MF$0.65

NATIONAL SCIENCE FOUNDATION SHIP SUPPORT FOR 1964-65.
Final rept., 1 Sep 64-31 Aug 65,
Alaska Univ., College. Inst. of Marine Science.
D. W. Hood, and George A. Solli.20 Dec 66, 21p
Grant NSF-GP-3441

Descriptors: (*Oceanographic data, *Hydrology), (*Oceanology, *Oceanographic vessels), Salinity, Ocean bottom sampling, Sedimentation, Clay minerals, Bathythermograph data, Chemical analysis, Depth finding, Underwater sound, Experimental data, Alaska.

The cruise track carried the ship about 200 miles west of Vancouver Island to Ketchikan and north in the Inside Passage to Glacier Bay, including a transect of stations in Cape Spencer. Detailed cruise programs, including dates of sailing, personnel and brief description of the work performed, are given in the appendix. The most ambitious undertaking during the year was a cruise labeled as 'Southern Cross' which went down the Inside Passage to Vancouver, west to Honolulu, Hawaii, east to Port Angeles, Washington, and north through the Inside Passage to Juneau. The total cruise took 55 days. Hydro stations were taken throughout the cruise to support a detailed chemistry program involving thiamine distribution, nitrogen cycling and silica distribution in the water transversed. During this year, our continuing program for work in the Unimak Pass area of the Aleutians was initiated. In all, the ship was at sea 167 days during the first year of operation.
PB-174 523 HC$3.00 MF$0.65

8J. PHYSICAL OCEANOGRAPHY

ON THE CHANGE IN ELECTRICAL CONDUCTANCE OF SEAWATER WITH TEMPERATURE,
Oregon State Univ Corvallis Dept of Oceanography
Peter K. Weyl. 1964, 4p
Contract Nonr-1286 (10), Grant NSF-GP-2044
Availability: Published in Limnology and Oceanography v9 n1 p75-8 Jan 1964.

Descriptors: (*Sea water, Electrical conductance), Sodium chloride, Solutions, Temperature, Experimental data.

A comparison of the measurements of the specific conductance of seawater by Thomas Thompson, and Utterback and of sodium chloride solutions by Bremner, Thompson, and Utterback shows that the temperature dependence of the two are essentially the same. The data are consistent with those of Gheorghiu and Calinicenco, but their conclusion that the temperature coefficient of conductance of seawater is measurably greater than that of sodium chloride solutions is in error. (Author)
AD-650 589 Not available from CFSTI.

THE ORIGIN OF MANGANESE NODULES ON THE OCEAN FLOOR,
Washington Univ Seattle Dept of Oceanography
For primary bibliographic entry see Field 8D.
AD-650 647 Not available from CFSTI.

PALAGONITE TUFFS (HYALOCLASTITES) AND THE PRODUCTS OF POST-ERUPTIVE PROCESSES,
Washington Univ Seattle Dept of Oceanography
Y. Rammohanroy Nayudu. 1964, 31p Rept no. Contrib-341
Contracts Nonr-477 (10), Nonr-477 (37)
Prepared in cooperation with Scripps Institution of Oceanography, La Jolla, Calif. Prepared for presentation at the IAV scientific session of Aug 30, 1963 (XIII General Assembly, I.U.G.G.).
Availability: Published in Bulletin Volcanologique v27 20p 1964.

Descriptors: (*Sedimentary rock, *Ocean bottom), Volcanoes, Rock (Geology), Petrology, X-ray diffraction analysis, Basalt, Manganese, Ores (Metal sources), Sea water, Minerals, Clay, Chemical precipitation, Marine geology.

A review of the origin of palagonite tuffs is presented. Additional data from the Pacific Ocean are included. The petrography and x-ray studies of selected samples and pertinent results from the experimental Mohole drilling are also presented. Main emphasis is focused on the products of post-eruptive processes in palagonite tuffs (hyaloclastites). From the inference awn it is concluded that some important minerals on the deep-sea floor, mainly manganese minerals, carbonates and zeolites show their genetic relationship to palagonite tuff breccias of submarine origin.
AD-650 648 Not available from CFSTI.

NUTRIENT REGENERATION FROM PHYTOPLANKTON DECOMPOSING IN SEA WATER.
Master's thesis,
Washington Univ Seattle Dept of Oceanography
Edwin V. Grill, and Francis A. Richards. 1964, 19p Rept no. Contrib-298
Contract Nonr-477 (10), Grant NSF-G19784
Availability: Published in Journal of Marine Research v22 n1 p52-69 1964.

Descriptors: (*Plankton, Decomposition), (*Sea water, Salts), Phosphates, Nitrites, Nitrates, Silicates, Ammonia, Solutions, Minerals.

A laboratory model of the regeneration of the inorganic nutrient salts of phosphorus, nitrogen, and silicon from diatom cells decaying in the dark while subject to bacterial attack was studied. The system was analyzed for phosphate, dissolved and particulate organic phosphorus, ammonia, nitrite, nitrate, dissolved and particulate nitrogen, and orthosilicate concentrations. The observations extended over a period of more than one year, but the significant changes appear to have been restricted to the first five months. Nitrogen remineralization, which did not go beyond ammonification, following an initial lag period, proceeded at a rate of 16:1, by atoms, relative to the rate of phosphorus remineralization. This experimental result is in close agreement with the hypothesis developed by Redfield from the relative distribution of nitrate and phosphate in the sea. Comparison of silica resolution with phosphorus remineralization, however, did not confirm Richards' hypothesis, which was similarly derived from the relative distribution of phosphate and silicate in the sea. A mechanism for phosphorus remineralization consisting of a simple first-order chain process was developed from kinetic considerations. (Author)
AD-650 649 Not available from CFSTI.

THE SPECTROPHOTOMETRIC DETERMINATION OF AMMONIA AND LABILE AMINO COMPOUNDS IN FRESH AND SEAWATER BY OXIDATION TO NITRITE.
Washington Univ Seattle Dept of Oceanography
For primary bibliographic entry see Field 8D.
AD-650 650 Not available from CFSTI.

DISSOLVED GASES OTHER THAN CARBON DIOXIDE,
Washington Univ Seattle Dept of Oceanography
Francis A. Richards. 1964, 29p Rept no. Contrib-338
Contract Nonr-477 (37), Grant NSF-G19784
Prepared in cooperation with Woods Hole Oceanographic Inst., Mass.
Availability: Published in Unidentified journal.

Descriptors: (*Sea water, Gases), Oxygen, Nitrogen, Argon, Helium group gases, Solutions, Diffusion, Concentration (Chemistry), Solubility.

Contents: Introduction (Studies of dissolved oxygen, Studies of dissolved nitrogen, Processes leading to the Alteration of the concentrations of dissolved gases); Physical factors controlling the gas content of sea water (The solubility of oxygen in sea water, The solubility of nitrogen and argon in sea water The solubility of the other noble gases in sea water, The state of equilibrium at the sea surface, Exchange of gas across the sea surface); Changes of gas concentration caused by in situ processes (Oxygen, Nitrogen, The noble gases); Advective and diffusive processes; Some oceanographic applications of dissolved gas distributions.
AD-650 633 Not available from CFSTI.

ANOXIC BASINS AND FJORDS,
Washington Univ Seattle Dept of Oceanography
Francis A. Richards. 1964, 35p Rept no. Contrib-337
Contract Nonr-477 (37), Grant NSF-G-19784
Availability: Published in Unidentified journal.

Descriptors: (*Sea water, Oxygen), Ocean currents, Plankton, Salinity, Organic materials, Oxidation, Sulfates, Reduction (Chemistry), Phosphates, Oxidation-reduction reactions, Sulfides, pH, Toxicity.
Identifiers: Fjords.

Contents: Classification and examples of oxygen-deficient and anoxic marine systems (Oxygen-deficient environments, Intermittently anoxic systems, Permanently anoxic systems, Landlocked fjords containing relict sea water); Some aspects of the physical oceanography of anoxic basins and fjords (The stability across the sills of anoxic basins and fjords, Flushing of anoxic basins, Circulation and exchanges); Chemical and biochemical characteristics of anoxic basins and fjords (The steps in the oxidation of organic matter, and a stoichiometric model); Some consequences of anoxic conditions (Consequences of denitrification, Lowered redox potentials, Accumulation of organic decomposition products, Toxicity of sulphides, Reduction of sulphate: chlorinity ratios).
AD-650 654 Not available from CFSTI.

EXTENSION OF NORTHEASTERN-PACIFIC FRACTURE ZONES,
Scripps Institution of Oceanography La Jolla Calif
H. W. Menard. 7 Oct 66, 3p
Contract Nonr-2216 (23)
Availability: Published in Science v155 n3758 p72-4 Jan 6 1967.

Descriptors: (*Ocean bottom topography, *Pacific Ocean), (*Faults (Geology), Pacific Ocean), Marine geology, Oceanology, Geology.

The great fracture zones of the northeastern Pacific extend into the central Pacific. At a relatively constant distance of 4500 to 4900 kilometers west of the crest of the East Pacific Rise and of its projection through North America, the typically straight and simple fracture zones branch and become more complex. However, the Clipperton fracture zone, including one branch, follows a great circle for almost 10,000 kilometers, a quarter of Earth's circumference. (Author)
AD-650 660 Not available from CFSTI.

COLUMBIA RIVER PLUME IDENTIFICATION BY SPECIFIC ALKALINITY,
Oregon State Univ Corvallis Dept of Oceanography
Kilho Park. 1966, 4p
Contract Nonr-1286 (10), Grant NSF-GP-2232
Availability: Published in Limnology and Oceanography v11 n1 p118-20 Jan 1966.

Descriptors: (*Rivers, *Chemical properties), River currents, Salinity, Alkaline earth compounds, Surface properties, Identification, Chlorine compounds, Washington (State), Oregon.

The plume of the Columbia River in the Pacific Ocean is the site of many interesting oceanographic processes. This water, measurably diluted by the Columbia River outfall, is easily identified by its salinity. For convenience, the plume has been defined as those waters contiguous to the mouth of the Columbia River having salinity less than 32.5‰. This definition, however, also includes seawater diluted by rain and by other river waters. Specific alkalinity (alkalinity: chlorinity ratio) is potentially useful for making this distinction. The specific alkalinity of Columbia River water is about 1,000 times that of seawater. (Author)
AD-650 661 Not available from CFSTI.

CARBONATE CYCLE AND THE BUFFER MECHANISM OF RECENT OCEANS,
Oregon State Univ Corvallis Dept of Oceanography
Ricardo M. Pytkowicz. 5 Nov 65, 11p
Contract Nonr-1286 (10), Grant NSF-GP-2566
Availability: Published in Geochimica et Cosmochimica Acta v31 p63-73 1967.

Descriptors: (*Carbonates, *Oceans), Buffers, Carbon dioxide, Sedimentation, Geochemistry, pH, Ocean bottom sampling, Degradation.

Existing estimates of the fluxes of carbon dioxide and carbonates through the oceans are extended to include solution of calcium carbonate and oxidative regeneration of carbon dioxide at depth. The relative roles of carbonates and silicates in the buffer mechanism of the oceans are examined and it is shown that, within a short time scale, carbonates are the primary buffering agents. (Author)
AD-650 662 Not available from CFSTI.

CONCENTRATION PROFILES OF BARIUM AND LEAD IN ATLANTIC WATERS OFF BERMUDA,
Scripps Institution of Oceanography La Jolla Calif
Tsaihwa J. Chow, and C. C. Patterson. 1 Oct 66, 6p
Contracts Nonr-2216 (23), AT (04-3)-427
Prepared in cooperation with California Inst. of Tech., Pasadena. Div. of Geological Sciences.
Availability: Published in Earth and Planetary Science Letters v1 n6 p397-400 1966.

Descriptors: (*Oceanology, *Atlantic ocean), (*Oceanographic data, *Barium), (*Lead, *Isotopes), Surface properties, Ocean bottom sampling, Salinity, Samplers, Quantitative analysis, Industries, Water pollution, Bermuda.

The purpose of this study is to look for industrially produced lead and to compare the vertical profiles of barium and lead in Atlantic water with those in the Pacific. Bermuda Island was selected as the site because it is about 1000 km off the mainland and is relatively free from immediate land influence for lead. There are no major industrial complexes on the island to cause local pollution of lead except airplane traffic. The isotope dilution procedure of Chow was used for lead analysis. A single determination was made for each sample and the precision of analysis was about plus or minus 10%. Salinity of sea water was determined at Scripps Institution of Oceanography. (Author)
AD-650 663 Not available from CFSTI.

DEEP-SEA IRON DEPOSIT FROM THE SOUTH PACIFIC,
Miami Univ Fla Inst of Marine Science 1004
For primary bibliographic entry see Field 8G.
AD-650 695 Not available from CFSTI.

INSTRUMENTS AND METHODS: A LARGE WATER SAMPLER, RUPTURE-DISC TRIGGERED, FOR STUDIES OF DISSOLVED ORGANIC COMPOUNDS.
Technical rept.,
Woods Hole Oceanographic Institution Mass
R. C. Clark, Jr., M. Blumer, and S. O. Raymond.
1 Aug 66, 8p Rept no. WHOI-Ref-67-13
Contract Nonr-2196 (00), Grant NSF-GP-3250
Availability: Published in Deep-Sea Research v14 p125-8 1967.

Descriptors: (*Oceanology, *Samplers), (*Water, Samplers), Organic compounds, Sampling, Water filters, Sea water, Membranes, Pressure, Ocean bottom sampling.

A variable capacity (1-15 l.) water sampler is described. It collects, at depth, filtered sea water with minimum organic contamination. It consists of an aluminum pressure case with a glass liner and is equipped with a membrane filter inlet, a capillary flow restrictor and a rupture disc which initiates sampling at a predetermined pressure. This sampler requires no actuation from the surface and contains no moving parts. (Author)
AD-650 713 Not available from CFSTI.

COMPILATION OF REPRINTS.
Oregon State Univ Corvallis Dept of Oceanography
For primary bibliographic entry see Field 8D.
AD-650 725 Not available from CFSTI.

UNITED STATES NAVAL OCEANOGRAPHIC OFFICE MARINE GEOPHYSICAL SURVEY PROGRAM, 1965-1967: NORTH ATLANTIC OCEAN, NORWEGIAN SEA AND MEDITERRANEAN SEA, AREA 5 - VOLUME 5, GEOLOGY AND GEOPHYSICS.
Texas Instruments Inc Dallas Science Services Div
1 Jan 67, 46p
NOO-SP-95-5-5
Contract N62306-1687

Descriptors: (*Atlantic Ocean, *Oceanographic data), (*Marine geophysics, Atlantic Ocean), (*Marine geology, Atlantic Ocean), Geological survey, Ocean bottom topography, Continental shelves, Terrestrial magnetism, Seismic waves, Sedimentation, Deposits, Distribution, Mapping, Azores.

Survey Task Area 5 includes an area lying between 40 and 32 deg N, and approximately from the Portuguese and Moroccan coastal areas to 32 deg W in the north and to 37 deg W in the south. The physiographic provinces considered within this area include the continental margin, near shore abyssal plains, Madeira Plateau and Horseshoe Seamont group, Azores-Gibraltar Ridge, Madeira Basin, abyssal hills, Mid-Atlantic Ridge system. Analysis of bathymetry, magnetic, and sediment thickness and distribution data are presented. Topographic studies of the slopes and linear features in the area are summarized. Information on bottom photography, velocity profiles and sediment cores is given in AD-650 861, and AD-650 862 summarizes field operations in the area.
AD-650 860 HC$3.00 MF$0.65

UNITED STATES NAVAL OCEANOGRAPHIC OFFICE MARINE GEOPHYSICAL SURVEY PROGRAM 1965-1967: NORTH ATLANTIC OCEAN, NORWEGIAN SEA AND MEDITERRANEAN SEA, AREA 5 - VOLUME 6, OCEANOGRAPHIC STATIONS AND VELOCITY PROFILES.
Texas Instruments Inc Dallas Science Services Div
1 Feb 67, 142p
NOO-SP-95-5-6
Contract N62306-1687

Descriptors: (*Atlantic Ocean, *Oceanographic data), (*Marine geophysics, Atlantic Ocean), (*Ocean bottom, Atlantic Ocean), Ocean bottom

topography, Photographic analysis, Acoustics, Sound, Velocity, Salinity, Temperature, Sedimentation, Ocean bottom sampling, Mapping, Azores.

The volume presents a composite of bottom photography, velocity profile, and sediment core data derived from oceanographic data stations in MGS Task Area 5. This Task Area includes an area lying between 40 and 32 degrees N, and approximately from the Portuguese and Moroccan coastal areas to 32 deg. W in the north and to 37 deg. W in the south. The most significant conclusion from the data presented is considered to be the close agreement between the Nansen cast and the velocimeter profile methods of determining velocity. The principle geological and geophysical features of the region are described in AD-650 860, and a summary of field operations is given in AD-650 862.

AD-650 861 HC$3.00 MF$0.65

UNITED STATES NAVAL OCEANOGRAPHIC OFFICE MARINE GEOPHYSICAL SURVEY PROGRAM, 1965-67: NORTH ATLANTIC OCEAN, NORWEGIAN SEA AND MEDITERRANEAN SEA, AREA 5 - VOLUME 8, FIELD OPERATIONS.

Texas Instruments Inc Dallas Science Services Div
6 Jan 67, 54p
N00-SP-95-5-8
Contract N62306-1687

Descriptors: (*Atlantic Ocean, *Oceanographic data), (*Marine geophysics, Atlantic Ocean), Geological survey, Ocean bottom, Oceanographic equipment, Oceanographic vessels, Mapping, Azores.

A summary is given of oceanographic survey operations in an area of the North Atlantic lying between 40 and 32 degrees N, and approximately from the Portuguese and Moroccan coastal areas to 32 deg. W in the north and to 37 deg W in the south. Descriptions are given of the data collection platforms, and of the equipment and subsystems aboard the two ships used (RV Arctic Seal and RV Atlantic Seal). Information is also included on the data collection staff, data collection techniques, and support operations. Certain of the data collected are presented and interpreted in AD-650 860 and AD-650 861.

AD-650 862 HC$3.00 MF$0.65

OCEANOGRAPHIC ATLAS OF THE NORTH ATLANTIC OCEAN. SECTION VI. SOUND VELOCITY.

Naval Oceanographic Office Washington D C
1967, 47p Rept no. NOO-Pub-700-Sect-6
Availability: Hard copy available from Naval Oceanographic Office, Washington, D. C., 20390. $1.50.

Descriptors: (*Oceanographic data, *Atlantic Ocean), (*Underwater sound, *Velocity), (*Maps, Atlantic Ocean), Depth finding, Oceans, Computers, Periodic variations, Temperature, Salinity, Acoustic properties, Tables, Arctic Ocean, Northern Hemisphere, Navy.

The publication contains Section VI of the Oceanographic Atlas of the North Atlantic Ocean. Presented in this section is the sound velocity structure in the North Atlantic Ocean from the Equator to 68 deg. N and Caribbean, Gulf of Mexico, southern portion of the Norwegian Sea, North Sea, Baltic Sea, Mediterranean, and Black Sea. The primary source of information for this atlas was machine processed serial oceanographic data from the historical files of the National Oceanographic Data Center (NODC). These data include all serial stations for the North Atlantic Ocean and its adjacent seas for the period beginning some time in 1902 to 1 August 1962. Sound velocity information was computed from temperature, salinity, and depth data according to the equation developed by W. D. Wilson. The atlas was preceded by U. S. Naval Oceanographic Office Technical Report 171, 'An Interim Report on the Sound Velocity Distribution in the North Atlantic Ocean,' in which a selected group of 488 sound velocity profiles was analyzed by a method similar to the one used herein. Results agree very well, especially in low latitudes. Increasing the data input approximately fortyfold broadened the sound velocity envelopes slightly, necessitated relocation of some boundaries in the North Atlantic, and of course, greatly increased the confidence level of this atlas. (Author)

AD-650 880 Not available from CFSTI.

CALCITE: RATES OF DISSOLUTION IN A VERTICAL PROFILE IN THE CENTRAL PACIFIC,

Scripps Institution of Oceanography La Jolla Calif
M. N. A. Peterson. 30 Sep 66, 4p
Contract Nonr-2216 (23)
Availability: Published in Science v154 n3756 p1542-4 Dec 1966.

Descriptors: (*Calcite, *Sea water), (*Pacific Ocean, Calcite), Minerals, Distribution, Solutions, Test equipment, Spheres, Weight.

Rate of dissoluton of calcium carbonate (calcite) was determined for a vertical profile 5000 meters deep in the central Pacific by measuring the loss of weight of optical calcite spheres arrayed on a mooring. Waters of the Pacific are undersaturated in all but the upper several hundred meters. A sharp increase in the rate of dissolution occurs at a depth of about 3700 meters, which corresponds closely to the depth below which calcite has been dissolved from the sediments. (Author)

AD-650 964 Not available from CFSTI.

SYMPOSIUM ON INTERDISCIPLINARY ASPECTS OF RADIATIVE ENERGY TRANSFER.

General Electric Co Philadelphia Pa Missile and Space Div
For primary bibliographic entry see Field 20F.

AD-651 048 HC$3.00 MF$0.65

REMOTE SENSING BY INFRARED AND MICROWAVE RADIOMETRY. I. BASIC PRINCIPLES. II. A TECHNIQUE FOR THE CORRECTION OF AIRBORNE MEASUREMENTS OF APPARENT SURFACE TEMPERATURE OF NATURAL WATER BODIES. III. POTENTIAL APPLICATIONS OF INFRARED AND MICROWAVE RADIOMETRY.

Wisconsin Univ Madison Dept of Meteorology
For primary bibliographic entry see Field 14B.

AD-651 188 HC$3.00 MF$0.65

SEA-WATER ENVIRONMENT FOR THE MEL OCEAN PRESSURE LABORATORY, PHASE II. SEA-WATER ACQUISITION, PROCESSING, AND CONTROL OF PARAMETERS.

Research and development rept.,
Navy Marine Engineering Lab Annapolis Md
E. M. Stanley. Mar 67, 47p Rept no. MEL-11/67

Descriptors: (*Oceanographic data, *Sea water), Environmental tests, Sampling, Oceans, Pressure, Laboratories, Salinity, Maps, Tables.

Investigation of the different factors concerning the sea-water environment for the MEL ocean pressure facility determined that the water should be gathered by barge from Raleigh and Onslow Bay, North Carolina, or near the 100-fathom curve off the mouth of Chesapeake Bay: upon arrival at the Laboratory, the water should be filtered to remove biological life and brought to the proper salinity by addition of freshwater or concentrated natural seawater; further control of properties such as O2, CO2 can be accomplished by purging with compressed air; the environment should be monitored frequently during introduction of new seawater into the facility and during experiments to ensure uniform conditions; and the water should be renewed after each experiment or at least once a day. Finally, a proposed processing system was illustrated showing how the different equipment and procedures discussed would work in an actual system. (Author)

AD-651 195 HC$3.00 MF$0.65

A STUDY OF THE MAIN REGULARITIES IN THE WATER STRUCTURE OF THE WORLD OCEAN,

Naval Oceanographic Office Washington D C
V. N. Stepanov. 1967, 13p Rept no. NOO-Trans-286
TT-67-61718
K Izucheniyu Osnovnykh Zakonomernostei Struktury Vod Mirovogo Okeana. Trans. of Okeanologicheskie Issledovaniya (USSR) n13 p9-16 1965.

Descriptors: (*Sea water, Physical properties), Temperature, Salinity, Density, Distribution, Deep water, Shallow water, Stability, USSR.

The study of the regularities in the structure of temperature, salinity and density fields, of water permits the elucidation of the role of main factors, determining the structure of the World Ocean waters. The types of water structure, obtained with the help of TS-curves for the World Ocean and the principal results of investigation of the vertical structure are discussed. On the basis of analysis of change of water stability gradients, the boundaries of surface, transition, intermediate, deep and bottom zones were determined; the water masses within these boundaries have the same names. The article contains a table of the lower boundaries of the structure zones for each ocean and for the World Ocean as a whole. (Author)

AD-651 199 HC$3.00 MF$0.65

DISTRIBUTION OF NITRATES AND NITRITES IN THE WATER OF NORTH INDIAN OCEAN,

Naval Oceanographic Office Washington D C
A. G. Rozanov, and V. S. Bykova. 1967, 13p
Rept no. NOO-Trans-323
TT-67-61719
Raspredelenie i Nitritov v Vode Severnoi Chasti Indiiskogo Okeana, Trans. of Akademiya Nauk SSSR. Institut Okeanologii. Trudy, v64 p94-101 1964.

Descriptors: (*Sea water, Nitrogen compounds), (*Nitrates, Sea water), (*Nitrites, Sea water), (*Indian Ocean, Sea water), Minerals, Distribution, Concentration (Chemistry), Shallow water, Deep water, Plankton, Oxidation-reduction reactions, Oxygen, USSR.
Identifiers: Andaman Sea, Arabian Sea, Bengal Bay.

The general distribution of dissolved mineral nitrates and nitrites in the Arabian Sea, Bay of Bengal, Andaman Sea and in the open northern part of the Indian Ocean is given. Mean value of nitrates: 1 micrograms-at N/1 in surface water, sharply increasing to 22-26 micrograms-at N/1 with depth. After achieving these concentrations the content of nitrate changes little. Nitrites as a thin layer were dissolved in the thermocline layer and under it in quantities depending on zooplankton (up to 2 micrograms-at N/1). In the Arabian Sea the second maximum of nitrites was discovered (up to 5 micrograms-at N/1 in 150-1500); it can be explained by the reduction conditions of these water. (Author)

AD-651 200 HC$3.00 MF$0.65

PROPOSED EXPERIMENTS FOR INVESTIGATING THE CHARACTERISTICS AND STABILITY OF ACOUSTIC TRANSMISSION PROPERTIES OF NORWEGIAN COASTAL WATERS.

Norwegian Defence Research Establishment, Kjeller.

For primary bibliographic entry see Field 20A.
For abstract, see STAR 05 11.
N67-23134 HC$3.00 MF$0.65

8K. SEISMOLOGY

PROCEEDINGS OF THE VESIAC SPECIAL STUDY CONFERENCE ON SEISMIC SIGNAL ANOMALIES, TRAVEL TIMES, AMPLITUDES, AND PULSE SHAPES.
Michigan State Univ., Ann Arbor. Inst. of Science and Technology.
Feb 66, 170p Rept. no. 4410-99-X
Contract SD-78

Descriptors: (*Seismic waves, asymposia), Anomalies, Earthquakes, Seismographs, Seismometers, Seismology, Lithosphere, Digital computers, Wave transmission, Microseisms, Explosions, Velocity, France, United States, New Zealand, Canada, Norway, Netherlands, West Germany, Spain, Italy, Great Britain, Epicenter.
Identifiers: P-Waves (Seismology), Vela-uniform, Hasiach tables.

This report contains 14 papers presented at the Vesiac Special Study Conference on seismic signal anomalies, travel times, amplitudes, and pulse shapes, which was held in Beaugency, France, near Paris, in October 1964. Investigations of these topics from the United States, New Zealand, Canada, Norway, Holland, West Germany, France, Spain, Italy, and The United Kingdom are included. (Author)
AD-478 537 HC$3.00 MF$0.65

SPECTRUM OF P AND PcP IN RELATION TO THE MANTLE-CORE BOUNDARY AND ATTENUATION IN THE MANTLE.
California Inst of Tech Pasadena Seismological Lab
Hiroo Kanamori. 1967, 15p Rept no. Contrib-1412
AFOSR-67-0879
Contract AF 49 (638)-1337
Availability: Published in Journal of Geophysical Research v72 n2 p559-71 Jan 15 1967.

Descriptors: (*Seismology, Seismological stations), (*Earthquakes, Seismology), Attenuation, Integral transforms, Phase measurement, Amplitude modulation, Theory, Seismic waves.
Identifiers: Mantle (Geology).

Spectrum analyses were made of the records of the short-period vertical component of P and PcP phases on seismograms of array stations at Tonto Forest, Arizona, for twenty-one earthquakes over the range delta = 47 degrees to 83 degrees. Generally, as has been reported by other investigators, the trace amplitude ratio of PcP to P is significantly larger than the theoretical ratio. A matrix method is applied to calculate the complex reflection coefficient of a transitional mantle-core boundary. Impulse responses calculated therefrom and comparison of the waveforms of P and PcP lead to the conclusion that the major discontinuity at the mantle-core boundary is sharp and is probably less than 1 km thick. The effect of a more gradual transition region superposed upon such a sharp discontinuity is also discussed. The possibility of the existence of a soft layer terminated by a sharp boundary cannot be totally ruled out. (Author)
AD-650 658 Not available from CFSTI.

THE INTERNAL STRUCTURE AND PHYSICS OF THE EARTH.
National Aeronautics and Space Administration. Washington, D. C.
V. A. Magnitskiy. Apr 67, 455p NASA-TT-F-395
Transl. into English of the Book "vnutrenneye Stroyeniye I Fizika Zemli" Moscow, Izd. Nedra, 1965

Descriptors: *Bibliography, *Earth crust, *Geophysics, *Grivitational field, *Seismology, Crust, Earth, Field, Gravitational, History, Internal, Mantle, Oscillation, Pressure, Property, Rheology, Shell, Structure, Thermal.

For abstract, see STAR 05 11.
N67-23321 HC$3.00 MF$0.65

MACRODEFORMATION RESULTING FROM THE HANDCAR EVENT.
California Univ., Livermore. Lawrence Radiation Lab.
For primary bibliographic entry see Field 8G.
For abstract, see NSA 21 09.
UCRL-50149 HC$3.00 MF$0.65

8N. TERRESTRIAL MAGNETISM

ANALOGUE MODEL MEASUREMENTS FOR ELECTROMAGNETIC VARIATIONS NEAR A COASTLINE.
Victoria Univ (British Columbia) Dept of Physics
H. W. Dosso. 15 Jul 66, 21p
Grant DRB-9511-62
Availability: Published in Canadian Journal of Earth Sciences v3 p917-36 1966.

Descriptors: (*Terrestrial magnetism, Beaches), Canada, Electromagnetic fields, Interfaces, Measurement, Models (Simulations), Analog systems.

An analogue model for studying the behavior of the natural geomagnetic and telluric field variations for the coastline problem is discussed. Measurements of amplitudes and phases for the horizontal electric, the horizontal magnetic, and the vertical magnetic field components for sloping earth-sea interfaces and for a sea over an upwelling conducting zone within the mantle in the form of a step are discussed for both the E and the H polarizations. (Author)
AD-650 783 Not available from CFSTI.

A SYSTEM FOR THE MEASUREMENT OF MAGNETIC MICROPULSATIONS AT SEA.
Pacific Naval Lab Esquimalt (British Columbia)
R. A. Hafer. 25 Apr 66, 9p Rept no. PNL Reprint-66-9
Proceedings of the joint IERE-IEE, Symposium on Microwave Applications of Semiconductors.
Availability: Published in Proceedings of the Conference on Electronic Engineering in Oceanography p11/1-11/8 1966.

Descriptors: (*Terrestrial magnetism, Deep water), (*Oceanographic equipment, Terrestrial magnetism), Canada, Measurement, Magnetometers, Buoys, Telemeter systems.

A free-drifting buoy system for making measurements of magnetic micropulsations in the deep ocean will be described. A spar buoy system is used to provide a stable platform in low to moderate sea states. The magnetic sensor, suspended 75 to 500 feet below the surface, is an optically-pumped Rb vapour magnetometer with a sensitivity of about 0.02 nT in the micropulsation band. The magnetometer uses a crossed-beam optical system to minimize heading errors in the vertically suspended buoy configuration and to allow operation at high magnetic latitudes. Measurements of swell and wave activity are made using an accelerometer, a pressure transducer, and a capacitive wave pole. The signals from the buoy sensors are telemetered to a nearby ship via a standard f.m./f.m. radio system operating in the v.h.f. band. To obtain the large dynamic range capabilities of the magnetometer direct digital recording is used. The magnetometer signal, a frequency proportional to the magnetic field strength, is filtered, frequency-multiplied, and counted while the wave sensor signals are detected and digitized in an eleven-bit analogue-to-digital converter. The resulting signals are time multiplexed and recorded on an incremental magnetic tape recorder. Analogue magnetic tape recordings are used as a back-up to the digital system. A paper chart recorder provides a visual display of micropulsation and wave activity. (Author)
AD-650 789 Not available from CFSTI.

SOME RESULTS OF MAGNETOTELLURIC SOUNDING IN THE IRKUTSK AMPHITHEATER.
Directorate of Scientific Information Services Ottawa (Ontario)
V. I. Pospeev. Sep 66, 6p Rept no. T-451-R
TT-67-61620
Trans. of Geologiya i Geofizika (USSR), n5 p94-6 1965.

Descriptors: (*Telluric currents, Anomalies), (*Terrestrial magnetism, Siberia), (*Structural geology, *Siberia), Lithosphere, Stratigraphy, Geophysical prospecting, Rock (Geology), Electromagnetic properties, USSR.

Results are given of a magnetotelluric survey of the Irkutsk amphitheater (the southern part of the Siberian Platform) which was undertaken in an effort to clarify the question of which factors influence the magnetic field. Particular attention was given to the nature of the underlying horizon, the specific resistance of the crystalline basement, and the relief of the deep conducting horizon of the upper mantle.
AD-650 885 HC$3.00 MF$0.65

A STUDY ON THE MORPHOLOGY OF MAGNETIC STORMS, GEOMAGNETIC TIME.
Scientific rept. no. 2, 1 Sep-30 Nov 55,
Alaska Univ., College. Geophysical Inst.
Sydney Chapman. 13 Jan 56, 19p
AFCRC-TN-56-263
Contract AF 19 (604)-1048

Descriptors: (*Magnetic storms, Terrestrial magnetism), Time, Analysis, Magnetism, Graphics, Diagrams, Equations.

The relation between mean (or apparent) geomagnetic time and mean (or apparent) local time is shown analytically. A convenient graphical method of determining the difference between the two time-systems to 0.1 minute is given. (Author)
AD-91 445 HC$3.00

OGO-A MAGNETIC FIELD OBSERVATIONS.
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
M. Campbell, J. P. Heppner, B. G. Ledley, T. L. Skillman, and M. Sugiura. Mar 67, 152p NASA-TM-X-55740, X-612-67-150

Descriptors: *Geomagnetic field, *Magnetic measurement, *Ogo-a, Aurora, Bow, Field, Flight, Fluctuation, Geomagnetic, Instability, Latitude, Magnetic, Magnetometer, Magnetopause, Measurement, Night, Satellite, Shock, Wave, Zone.

For abstract, see STAR 05 11.
N67-22078 HC$3.00 MF$0.65

PERTURBATIONS OF AES ORBITS FROM TESSERAL HARMONICS OF GRAVITATIONAL POTENTIAL EXPANSION.
Volt Technical Corp., Washington, D. C.
For primary bibliographic entry see Field 22C.
For abstract, see STAR 05 11.
N67-22299 HC$3.00 MF$0.65

SEABORNE MAGNETIC MEASUREMENTS CAPE TOWN - SANAE, DECEMBER 1965 - JANUARY 1966.

Hermanus Magnetic Observatory (South Africa). H. D. Poole, and A. M. Van Wijk. Sep 66, 11p B-7 Its Geophys. Ser. No. 1

Descriptors: *Antarctica, *Magnetic measurement, *Table, Detector, Geophysics, Magnetic, Magnetometer, Measurement, Proton, Recording, Ship.

For abstract, see STAR 05 11.
N67-22470 HC$3.00 MF$0.65

THE ORDERED MAGNETIC FIELD OF THE MAGNETOSHEATH.
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
For primary bibliographic entry see Field 4A.
For abstract, see STAR 05 11.
N67-23320 HC$3.00 MF$0.65

9. ELECTRONICS AND ELECTRICAL ENGINEERING

9A. COMPONENTS

UTC NEWS LETTER, NO. 29, OCTOBER 1960.
Comptometer Corp., Niles, Ill. Union Thermoelectric Div.
1960, 9p
Contract DA-36-039-sc-71061
Report on quartz resonator developments.

Descriptors: (*Quartz resonators, Reviews), Vibrators (Electrical), Performance (Engineering), Low frequency, Miniature electronic equipment, Crystal filters, Electrodes, Specifications.

Topics include: preliminary information on a newly-developed SL cut quartz vibrator; effects of size on electrode preformance, especially as applied to miniature and filter crystals; corrections and additions to various specifications.
AD-246 378 HC$3.00

AN INVESTIGATION OF BASIC MECHANISMS OF TRANSIENT HIGH ENERGY RADIATION EFFECTS IN INSULATORS AND SEMICONDUCTORS.
Annual rept. no. 3,
Hughes Aircraft Co., Fullerton, Calif. Ground Systems Group.
V. R. Honnold, C. C. Berggren, R. R. Emmert, and G. D. Thomas. 17 Dec 64, 67p FR-10-347
Contract Nonr-4360 (00)

Descriptors: (*Semiconductors, Electron beams), (*Electric insulation, Electron beams), Nylon, Nuclear explosion damage, Halocarbon plastics, Boundary value problems, Numerical analysis, Optical phenomena, Differential equations, Mathematical analysis, Transients, Halides, Alkali metals, Polyethylene plastics, Radiation damage, Solid state physics.

This program was concerned with developing a thorough understanding, in solid state theory, of the effect produced in electronic materials by nuclear weapon radiation. The program was directed in such a way as to provide an answer to the following practical questions. Given a weapon time history, what are the physical processes and what are the mechanisms that determine their response time during and after exposure to pulsed high energy radiation. More specifically, it is important to determine the nature of that process, in a given material, either semiconductor or insulator, that is rate limiting, since, in general, the response will not be governed by a single simple process. (Author)
AD-462 730 HC$3.00

ELECTROSTATIC FOCUSING OF HOLLOW SPIRALING ELECTRON BEAMS.
Final rept., 5 Jan 65-Nov 66,
City Coll Research Foundation New York 33
M. Ettenberg. Mar 67, 94p
ECOM-00466-F
Contract DA-28-043-AMC-00466 (E)

Descriptors: (*Electron beams, Focusing), Electron guns, Cathodes (Electron tubes), Space charges, Microwave equipment, Performance (Engineering).

A number of experimental models of a radial injection cathode for electrostatic focusing were built and tested. The most successful of these models gave a transmission efficiency of about 70% at low perveances. The highest perveance model gave a maximum of 30% transmission. A theoretical description has been developed for the focusing of a hollow spiraling electron beam which indicates the limits on this technique. It also gives design information on injection requirements. A computer study was made of the potential in the injection region in the absence of space charge. A computer study was also made of beam trajectories in the electrostatic focusing region under a variety of injection conditions. A computer study was begun of a simplified cathode injection area including the motion of emitted electrons and space charge effects. (Author)
AD-650 577 HC$3.00 MF$0.65

THEORY, DESIGN AND PERFORMANCE OF A RING CIRCULATOR.
Technical rept.,
Massachusetts Inst of Tech Lexington Lincoln Lab
S. D. Ewing, Jr., and J. A. Weiss. 17 Jan 67, 22p
Rept no. TR-429
ESD-TR-67-21
Contract AF 19 (628)-5167, ARPA Order-498

Descriptors: (*Waveguide circulators, S band), Ferromagnetic materials, Phase shifters, Waveguide filters, Design, Rings.

A compact, symmetrical, three-port S-band circulator composed of reciprocal tee junctions and nonreciprocal phase shifters is investigated theoretically, and its experimental performance results are presented. The comparison of these results demonstrates that (1) circulators can be designed and their experimental performance described from a network model and (2) there is no theoretical limitation on the minimum amount of total differential phase shift necessary for perfect circulation. Bandwidth is investigated and techniques are discussed, including the introduction of a 'backward wave' phase shifter, for achieving larger bandwidths. The stripline, nonreciprocal, comb-filter phase shifter used in the ring circulator is described and performance results are given. (Author)
AD-650 582 HC$3.00 MF$0.65

DEVELOPMENT OF LINEAR POWER TUBES.
Interim development rept., 17 Nov 66-16 Feb 67,
Eimac San Carlos Calif
William H. Sain. 20 Mar 67, 56p
Contract N00024-67-C-1044

Descriptors: (*Tetrodes, Ultrahigh frequency), (*Beam power tubes, Linear systems), Modulation, Distortion, Performance (Engineering), Amplifiers.

Two Phase I (200 - 500 watts PEP output) UHF tetrodes were made and sted at full power output. Third and fifth order intermodulation distortion product ratios were -40 db or better at more than fifty per cent plate circuit efficiency. Distortion calculations from the grid-plate transfer curves showed that the optimum (for minimum distortion) zero signal plate current was above the desirable level. Experimental Phase I tubes designed to operate at lower zero signal plate current and higher plate efficiency are under construction. Tests of an EIMAC linear tetrode, the 4CX1500B, showed that the linearity of this type is strongly dependent on the quiescent plate current and, to a lesser extent, on the screen grid voltage. (Author)
AD-650 614 HC$3.00 MF$0.65

R AND D OF THE TECHNOLOGIES REQUIRED TO DESIGN AND FABRICATE ULTRAHIGH-SPEED COMPUTER SYSTEMS.
Massachusetts Inst of Tech Lexington Lincoln Lab
For primary bibliographic entry see Field 9B.
AD-650 628 HC$3.00 MF$0.65

THEORY OF OHMIC CONTACTS.
Technical rept.,
Army Electronics Command Fort Monmouth NJ
Juri Vilms, and Lothar Wandinger. Feb 67, 19p
Rept no. ECOM-2800

Descriptors: (*Semiconductors, Circuit interconnections), Theory, Doping, Silicon, Gallium arsenides, Thermionic emission, Field emission, Resistance (Electrical).

Contact resistivity of a metal-semiconductor area contact is calculated for 10 to the 18th power - 10 to the 20th power/cu cm doping range, for n-type semiconductors and 0.7 - 1.0 eV barrier heights employing a thermionic-field emission model with neglect of barrier width fluctuation. Application to design of ohmic contact to group IV and III-V semiconductors is indicated. A criterion for an electrically good ohmic contact is proposed and the frequently encountered patchiness problem in practical alloy-contact work is discussed. (Author)
AD-650 738 HC$3.00 MF$0.65

THERMAL NOISE IN SPACE-CHARGE-LIMITED SOLID STATE DIODES.
Revised ed.,
Minnesota Univ Minneapolis Dept of Electrical Engineering
S. T. Liu. 9 Sep 66, 5p
AROD-5117:7
Contract DA-31-124-ARO (D)-291
Revision of manuscript received 8 Aug 66.
Availability: Published in Solid State Electronics Pergamon Press v10 p253-4 1967.

Descriptors: (*Diodes (Semiconductor), Noise (Radio)), Space charges, Thermal properties, Equations.

VAN DER ZIEL has shown that the equivalent noise resistance R sub n of a space-charge-limited solid state diode equals the d.c. resistance V sub a/I sub a of the device. That is R sub n = V sub a/I sub a. This note verifies the equation experimentally. (Author)
AD-650 761 Not available from CFSTI.

3.2 MILLIMETER WAVE OSCILLATOR.
Hughes Research Labs Malibu Calif Chemical Physics Dept
For primary bibliographic entry see Field 9E.
AD-650 768 HC$3.00 MF$0.65

EXPERIMENTAL TESTING OF THE IMPROVED 3-PULSE INTERROGATION SIDE LOBE SUPPRESSION SYSTEM.
National Aviation Facilities Experimental Center Atlantic City N J
For primary bibliographic entry see Field 17I.
AD-650 840 HC$3.00 MF$0.65

EXTREME ULTRAVIOLET RADIATION DETECTORS.

Electro-Mechanical Research Inc Princeton N J Photoelectric Div
For primary bibliographic entry see Field 17E.
AD-650 882 HC$3.00 MF$0.65

PROCEEDINGS OF THE SYMPOSIUM ON HYDROGEN THYRATRONS AND MODULATORS (5th) HELD AT FORT MONMOUTH, N. J., 20-22 MAY 1958.
Army Electronics Labs Fort Monmouth N J 31 1958, 335p
See also PB-156 660.

Descriptors: (*Thyratrons, Symposia), (*Modulators, Symposia), Hydrogen, Deuterium, Temperature control, Magnetic modulators, Magnetic materials, Pulse modulation, Discharge tubes, Diodes (Semiconductor), Radar equipment, Traveling-wave tubes.

Contents: Reservoirs in hydrogen thyratrons and a status report on the eg+g 1802 thyratron; Hydrogen and deuterium filled thyratrons; A note on hydrogen reservoir temperature control; Heat dissipation in pulse modulator thyratrons; Progress report on large ceramic hydrogen thyratrons; Equipment manufacturer's requirements for hydrogen thyratrons used in missile tracking transmitters; Design and performance of pulse magnetic modulators; Hybrid magnetic pulser; A magnetic assist for high-power hydrogen thyratrons; Materials for magnetic assist; Utilization of the mercury pool cathode for industrial and military tubes; The empretron, a mercury pool arc tube allowing operation at repetition rates in the kilocycle range; Vacuum tubes for pulse modulation at the megawatt level; Shaped pulse modulators with particular reference to the generation of sine squared pulses; Thyrite dummy magnetrons and super-non-inductive resistive loads; A gas clipper tube for high power modulators; Silicon diode applications in radar set an/frn-34 ( ); A high efficiency charging regulator for line type modulators; Design of high stability electronic voltage regulators for radar modulators; An automatic trigger synchronizer for multi-thyratron radar modulators; The protective spark gap as a pulse modulator component; Modulator techniques for gridded klystrons and traveling wave tubes; High duty cycle hard tube modulator for high power traveling wave tubes; An rf phase jitter tester for mti radar transmitters; Output voltage clamper with regulating action for line type modulators; Development of a high power clipper diode; Magnetic pulse modulator for a missile guidance system mp-505.
AD-650 899 HC$3.00 MF$0.65

A MINIATURE MONOSTRIP NANOSECOND PULSE DELAY LINE.
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
Stanley H. Gordon. 20 Jun 63, 25p Rept no. CF-3034
Contract NOw-62-0604

Descriptors: (*Delay lines, Microminiaturization (Electronics)), Dielectrics, Silicone plastics, Titanium compounds, Dioxides, Copper, Alumina, Electromagnetic pulses, Manufacturing methods, Photoengraving, Etching.

The miniature monostrip pulse delay lines described are smaller, lighter and more rugged than the equivalent coaxial line. They can be fabricated in many form factors and can be made to operate in extreme environments of near absolute zero temperature to over 1000C. Standard photographic plating and etching techniques are employed in the fabrication of these lines and the techniques are easily adapted to economical production procedures. The electrical design of the monostrip line is quite simple and flexible and almost any reasonable desired characteristic can be designed into the delay line. (Author)
AD-650 977 HC$3.00 MF$0.65

AN INVESTIGATION OF VACUUM DEPOSITED MULTILAYER THIN FILM CAPACITORS.
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
S. H. Gordon. 18 Apr 62, 17p Rept no. CF-2982

Descriptors: (*Capacitors, Films), Vacuum apparatus, Vapor plating, Microminiaturization (Electronics), Manufacturing methods, Circuits, Dielectric films.

An investigation was made of vacuum deposited multilayer thin film capacitors to reduce the area required for a given value of capacitance.
AD-650 990 HC$3.00 MF$0.65

MICROWAVE DETECTORS USING HOT CARRIER EFFECTS.
Army Electronics Command Fort Monmouth NJ
For primary bibliographic entry see Field 9E.
AD-651 023 HC$3.00 MF$0.65

SOLID STATE RESEARCH: 1967:1.
Massachusetts Inst of Tech Lexington Lincoln Lab
For primary bibliographic entry see Field 20L.
AD-651 065 HC$3.00 MF$0.65

IMPACT SHOCK ON PIEZOELECTRIC CERAMICS.
Edo Western Corp Salt Lake City Utah 4502
For primary bibliographic entry see Field 11B.
AD-651 100 HC$3.00 MF$0.65

PRODUCTION ENGINEERING OF TRIAXIAL PULSE CONNECTORS.
Summary engineering rept., 15 Jun 61-31 Dec 66.
Burndy Corp Norwalk Conn
Leonard H. Feldberg, and Mark Auriana. Apr 67, 153p
Contract DA-36-039-sc-85964
See also AD-623 176.

Descriptors: (*Electric connectors, Pulse cables), Manufacturing methods, Mechanical drawings, Electric insulation, Design, Economics, Electrical corona.

The report relates to the entire engineering and production effort as performed on the subject triaxial pulse connectors. It deals in detail with the major technical (economic as well as manufacture and function) problems encountered during the course of this project. These are as follows: (1) the cable, (2) the field termination assemblie ability of the cable to the plug half of the connector, (3) the primary receptacle of the insulator. (Author)
AD-651 193 HC$3.00 MF$0.65

PRODUCTION ENGINEERING MEASURE FOR SILICON SWITCHING TRANSISTORS.
Quarterly progress rept. no. 5, 25 May-25 Aug 66,
Motorola Inc., Phoenix, Ariz. Semiconductor Products Div.
Mark Siegel, and Jack Freese. Nov 66, 30p M-24
tract DA-36-039-AMC-06164 (E)
See also AD-640 894.

Descriptors: (*Transistors, *Manufacturing methods), Silicon, Diffusion, Etching, Photoengraving, Microminiaturization (Electronics), Processing, Cleaning, Electrodes, Probes, Masking.
Identifiers: Micropower.

Efforts were continued on a program to establish a production capability for a silicon NPN micropower switching transistor, type EL-2N (X-10). Work centered about finalization of material, diffusion, and probe specifications for the preproduction and production diffusion runs. Devices built to supply the final engineering sample have demonstrated the capability to produce both preproduction and production quantities. Additional processing work resulted in photoresist processing being improved by the addition of infrared procedures, contact metallization being improved by the revision of two cleaning procedures, and greater parameter stability being provided by the revision of assembly atmospheres. (Author)
AD-807 416 HC$3.00 MF$0.65

PRODUCTION ENGINEERING MEASURE, TRANSISTOR, VHF, SILICON, POWER (25WATT - 100 MHz).
Quarterly rept. no. 13, 1 Aug-31 Oct 66,
TRW Semiconductors, Inc., Lawndale, Calif. Advanced Communications Dept.
C. C. Thompson, K. O. Tillung, P. W. Anselmo, R. A. Batisti, and J. Crishal. 31 Oct 66, 36p
Contract DA-36-039-sc-86733 (E)

Descriptors: (*Transistors, Very high frequency), Transistor amplifiers, Silicon, Manufacturing methods, Quality control, Specifications, Military requirements, Packaging, Semiconductors, Acceptability, Test methods.

The first pre-production units were completed and all testing in accordance with the applicable specification completed. A complete list of up to date pilot line facilities was submitted and approved. Device performance was optimized and lots are processing continuously through the line. This assures positive control and good yields. (Author)
AD-807 693 HC$3.00 MF$0.65

PRODUCTION ENGINEERING MEASURE, TRANSISTOR, VHF, SILICON POWER 25 WATT, 100 Mc.
Quarterly rept. no. 12, 1 Apr 65-31 Jul 66,
TRW Semiconductors, Inc., Lawndale, Calif. Advanced Communications Dept.
P. W. Anselmo, P. N. Risinger, K. O. Tillung, R. G. Kamienski. 31 Jul 66, 113p
Contract DA-36-039-sc-86733 (E)
See also AD-807 693.

Descriptors: (*Transistors, Production control), Manufacturing methods, Silicon, Very high frequency, Specifications, Packaging, Silicones, Acceptability, Tensile properties, Life expectancy.
Identifiers: PEM (Production engineering meas-

This work covers the progress during the period 1 April 1965 to 31 July 1966. Processing of lots in pre-production continues to give assurance of good yields on a controllable basis. The change to a silicone molded package has given yield, package integrity, strength, and cost advantages over the older micropower package. The technique of using emitter and base stabilized resistors added to the crystal pattern of the original design gives improved saturated power handling and linearity. Temperature tests run by I. R. techniques show that the device is evenly balanced and stabilized. The efficiency and power gain is substantially increased by over 10% and 2DB over the original devices. The design has been optimized for 25 watts and is proving out in field tests. (Author)
AD-807 982 HC$3.00 MF$0.65

FABRICATION OF AN EIGHT-POLE COMMUTATOR, ASSOCIATED SHIFT REGISTER, CONTROL LOGIC SUBSYSTEM QUARTERLY TECHNICAL REPORT, 28 SEP. - 31 OCT. 1966.
Philco Corp., Santa Clara, Calif. Microelectronics Div.
B. Aronson. 30 Nov 66, 30p NASA-CR-83319, QTR-1
Contracts NAS7-100, JPL-951079
Prepared for Jpl

Descriptors: *Commutator, *Shift register, Counter, Decoder, Design, Dynamic, Mos, Register, Shift, Static, Switch.

For abstract, see STAR 05 11.
N67-22179 HC$3.00 MF$0.65

A SOLID STATE HIGH VOLTAGE DYNAMIC FILTER.
Aeronautical Research Labs., Melbourne (Australia).
D. C. Cocks. Dec 65, 12p ARL/FL-39

Descriptors: *Filter, *Solid state device, Acceleration, Calibrator, Coil, Current, Device, Direct, Dynamic, Electrodynamics, Field, High voltage, Power, Solid, State, Supply, Vibration.

For abstract, see STAR 05 11.
N67-22466 HC$3.00 MF$0.65

PROPOSAL FOR A NEW TYPE OF CAVITY RESONATOR.
Proposta Di Nuovi Tipi Di Risuona Tori A
Comitato Nazionale Per L Energia Nucleare, Frascati (Italy). Lab. Nazionali Di Frascati.
M. Puglisi. 14 Nov 66, 6p LNF-66/54
in Italian Its Nota Interna No. 335

Descriptors: *Cavity resonator, *Joule heating, *Reduction, Accelerator, Cavity, Conductor, Design, Diagram, Electronics, Experiment, Resistance, Resonator, Size, Theory.

For abstract, see STAR 05 11.
N67-23019 HC$3.00 MF$0.65

CUT-OFF CHARACTERISTICS OF A CYLINDRICAL MAGNETRON.
Weapons Research Establishment, Salisbury (Australia).
E. H. Hirsch. Aug 66, 23p WRE-TN-CPD-118

Descriptors: *Cut-off, *Magnetron, *Performance prediction, Anode, Axial, Charge, Current, Distribution, Electron, Field, Flow, Magnetic, Operation, Performance, Prediction, Space.

For abstract, see STAR 05 11.
N67-23088 HC$3.00 MF$0.65

RADIOGRAPHIC TECHNIQUES FOR RELIABILITY SCREENING OF RELAYS.
General Electric Co., Waynesboro, Va.
R. A. Holcomb, W. H. Lesser, and G. F. Trojanowski. 30 Sep 66, 66p NASA-CR-83535
Contract NAS8-20301

Descriptors: *Flaw detection, *Hermetic seal, *Radiography, *Relay, Analysis, Defect, Film, Metal, Soldering, Welding, X-ray.

For abstract, see STAR 05 11.
N67-23261 HC$3.00 MF$0.65

SATURN INTEGRATED CIRCUIT RELIABILITY TEST PROGRAM QUARTERLY PROGRESS REPORT, OCT. - DEC. 1966.
Motorola, Inc., Phoenix, Ariz. Semiconductor Products Div.
M. R. Carpenter, W. F. Gunkel, and K. R. Mac Kenzie. Dec 66, 109p NASA-CR-83538, QPR-2
Contract NAS8-18018

Descriptors: *Amplifier, *Component reliability, *Integrated circuit, *Saturn launch vehicle, *Test program, Bibliography, Characteristics, Circuit, Component, Electric, Integration, Lifetime, Manufacturing, Operation, Packaging, Performance, Program, Property, Reliability, Stress, Test.

For abstract, see STAR 05 11.
N67-23265 HC$3.00 MF$0.65

AMPLIFIER DRIFT TESTER.
National Aeronautics and Space Administration. Manned Spacecraft Center, Houston, Tex.
D. Cree, and G. E. Wenzel. Apr 67, 8p NASA-TN-D-3902
Contract 914-14-00-00-72

Descriptors: *Amplifier, *Drift, *Test equipment, Automatic, Characteristics, Data, Dc, Equipment, Gain, Measurement, Recording, Test, Zero.

For abstract, see STAR 05 11.
N67-23292 HC$3.00 MF$0.65

HIGH RELIABILITY SCREENING OF SEMICONDUCTOR AND INTEGRATED CIRCUIT DEVICES.
Grumman Aircraft Engineering Corp., Bethpage, N. Y.
J. Lombardi, L. Mc Donough, and H. Padden. Apr 67, 161p NASA-CR-721
Contract NAS5-9639

Descriptors: *Circuit reliability, *Integrated circuit, *Nondestructive testing, *Semiconductor device, Bibliography, Circuit, Data, Destruction, Destructive testing, Device, Digital, Failure, Integration, Mechanism, Nondestructive, Reliability, Screening, Semiconductor, Specification, Technique, Testing.

For abstract, see STAR 05 11.
N67-23322 HC$3.00 MF$0.65

FLAT CONDUCTOR TECHNOLOGY EXEMPLIFIED.
National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
Mar 67, 13p NASA-TM-X-53584

Descriptors: *Electric conductor, *Flat surface, *Multilayer structure, *Printed circuit, Board, Cable, Circuit, Conductor, Electric, Electronics, Equipment, Flat, Flexibility, Harness, Lead, Lightweight, Multilayer, Print, Structure, Surface, Technology, Wire.

For abstract, see STAR 05 11.
N67-23333 HC$3.00 MF$0.65

MACHINERY AND TOOLS USED IN THE MANUFACTURE OF ELECTRONIC PARTS AND COMPONENTS IN THE FEDERAL REPUBLIC OF WEST GERMANY.
Fry Consultants, Inc., Frankfurt am Maim (West Germany).
For primary bibliographic entry see Field 13H.
PB-174 551 HC$3.00 MF$0.65

9B. COMPUTERS

UNIVAC PROCESSING OF THE ELECTRONIC FAILURE TABULATION PROBLEM FOR THE BUREAU OF SHIPS.
David Taylor Model Basin Washington D C
Applied Mathematics Lab
For primary bibliographic entry see Field 15E.
AD-650 568 HC$3.00 MF$0.65

COMPUTER PROGRAM DOCUMENTATION STEAM CONDENSER DESIGN.
David Taylor Model Basin Washington D C
Applied Mathematics Lab
For primary bibliographic entry see Field 13A.
AD-650 571 HC$3.00 MF$0.65

DIAGNOSTIC STUDIES OF WEATHER SYSTEMS OF LOW AND HIGH LATITUDES (ROSSBY NUMBER< 1).
California Univ Los Angeles Dept of Meteorology
For primary bibliographic entry see Field 4B.
AD-650 573 HC$3.00 MF$0.65

SURVEY OF AUTOMATIC DIGITAL PLOTTERS.
Research and development rept.,
David Taylor Model Basin Washington D C
Applied Mathematics Lab
Sidney Lechter. Jan 60, 34p
DTMB-1386

Descriptors: (*Input-output devices, Mechanical drawings), Specifications, Reviews, Digital recording systems, Data processing systems.

Based on the results of a survey, the specifications of the latest commercially available automatic digital plotters are presented. These specifications emphasize the accuracy, input format, type of paper, plotting heads and symbols, and physical characteristics of these plotters. Costs and principles of operation are also given. (Author)
AD-650 592 HC$3.00 MF$0.65

THE ELECTRONIC INSTALLATION RECORD SYSTEM PROBLEM.
Research and development rept.,
David Taylor Model Basin Washington D C
Applied Mathematics Lab
Gilbert R. Gray, James R. Paul, and Marjorie C. Maupin. Apr 60, 142p
DTMB-1387

Descriptors: (*Electronic equipment, *Records), (*Data processing systems, Electronic equipment), Installation, Shipborne, Naval equipment, Digital computers.

This is a final report designed to analyze logically the Navy's Ship Electronic Inventory System and to explain procedure necessary to maintain this system on the UNIVAC high-speed digital computer. The system contains over 500,000 separate units of information which must be checked for accuracy and consistency and which must be processed in a variety of ways. The processing required more than 3200 hours of computer time to produce the more than 120,000 pages of reports required each year. (Author)
AD-650 593 HC$3.00 MF$0.65

MAGNETIC TAPE PROGRAMS AND USAGE FOR THE OPERATIONS CONTROL CENTER PROJECT.
David Taylor Model Basin Washington D C
Applied Mathematics Lab
Barbara R. Marshall. Nov 60, 125p
DTMB-1483

Descriptors: (*Digital computers, *Magnetic tape), (*Navy, Operations research), Computer programs, Programming (Computers), Data storage systems, Data processing systems.
Identifiers: IBM 704.

The report describes the magnetic tape programs and usage conventions established by the Operations Research Division for use in the Operations Control Center Project. The programs are written for the IBM 704 Computer. By providing one set of programs for handling all magnetic tape operations, restarting after interruption is greatly facilitated. Rules are included for the initial preparation of tapes, tape formats, and multi-reel handling. The routines included in the package are described in sufficient detail for their use by other programs in the Operations Control Project. (Author)
AD-650 596 HC$3.00 MF$0.65

TRAINING MANUAL ON PROGRAMMING FOR THE IBM 704.

Research and development rept.,
David Taylor Model Basin Washington D C Applied Mathematics Lab
Carl L. Tibery. Apr 60, 117p
DTMB-1368

Descriptors: (*Digital computers, Programming (Computers)), (*Programming (Computers), Instruction manuals), Flow charting, Programming languages, Computer programs, Subroutines.

The training manual consolidates the essential information from the IBM 704 Reference Manual, the Bell Telephone Laboratories IBM 704 Input-Output System - BE SYS 2, and the United Aircraft SAP 3-7 Programmer's Notes into one presentation, from which the mathematician can learn to write a program for the IBM 704 using those systems. Among the topics covered are flow charting, machine language, symbolic programming, subroutines, input-output operations, and FORTRAN, an IBM automatic coding system. Each chapter includes simple examples and exercises. (Author)
AD-650 603 HC$3.00 MF$0.65

THE CXPQ COMPUTER. A PRELIMINARY DESCRIPTION FOR PROGRAMMING PURPOSES.
David Taylor Model Basin Washington D C Applied Mathematics Lab
Barbara R. Sherard. Jul 59, 44p
DTMB-1356

Descriptors: (*Computers, Configuration), (*Programming (Computers), Input-output devices), Feasibility studies, Magnetic core storage, Magnetic tape, Control sequences, Operations research, Real time.

Contains a general description of the Philco CXPQ Computer and sufficient information on the Instruction Code to permit programming to be performed. The computer is inherently suitable for solving computational problems for feasibility research programming in areas not requiring excessive quantities of input output equipment.
AD-650 605 HC$3.00 MF$0.65

VARYING LENGTH FLOATING POINT ARITHMETIC: A NECESSARY TOOL FOR THE NUMERICAL ANALYST.
Stanford Univ Calif Dept of Computer Science
For primary bibliographic entry see Field 12A.
AD-650 620 HC$3.00 MF$0.65

R AND D OF THE TECHNOLOGIES REQUIRED TO DESIGN AND FABRICATE ULTRAHIGH-SPEED COMPUTER SYSTEMS.
Interim rept. no. 10, 1 Oct-31 Dec 66.
Massachusetts Inst of Tech Lexington Lincoln Lab
31 Dec 66, 35p
ESD-TR-67-181
Contract AF 19 (628)-5167
Prepared in cooperation with Philco-Ford Corp., Blue Bell, Pa. Microelectronics Div. See also AD-647 751.

Descriptors: (*Digital computers, Design), (*Logic circuits, Digital computers), (*Microminiaturization (Electronics), Logic circuits), Computer logic, Transistors, Manufacturing methods.

A description is given of the work performe ddoring the second quarter of the research and development program 'R + D of the Technologies Required to Design and Fabricate Ultrahigh-Speed Computer Systems.' The fabrication and evaluation phases of the 3-, 9-, and 27-bit parity arrays continued. In the area of new microcircuits, two new ECL designs, the SMX6 and SMX7, were completed. (Author)
AD-650 628 HC$3.00 MF$0.65

DOCUMENTATION TECHNIQUES FOR DIGITAL COMPUTERS.
Technical rept.,
Military Academy West Point N Y Dept of Electricity
Philip H. Enslow, Jr. Jan 67, 54p Rept no. Elec-67-1

Descriptors: (*Digital computers, Design), (*Documentation, *Computer logic), Equations, Mathematical logic, Programming (Computers), Training, Maintenance, Construction, Operation, Input-output devices.

A survey study of seventeen forms of digital computer design documentation is presented. Each technique is briefly described and several actual examples are given. Graphical, verbal, and mathematical techniques are covered.
AD-650 645 HC$3.00 MF$0.65

S-C 4020 MICROFILM RECORDER PROGRAMMING MANUAL 2.
Final rept.,
David Taylor Model Basin Washington D C Applied Mathematics Lab
Philip E. Battey. Feb 67, 62p
DTMB-2210

Descriptors: (*Digital computers, *Microfilm), Recording systems, Computer programs, Instruction manuals, Programming (Computers), Naval research.
Identifiers: CHARACTRON.

The report is a programming manual for the S-C 4020 Microfilm Recorder (CHARACTRON), at the Applied Mathematics Laboratory of the David Taylor Model Basin. The function and command structure of the various components of the recorder also are described. Use of the CHARACTRON with both the IBM 7090 and the LARC is explained. FORTRAN and LSC subroutines and calling sequences are described, and samples are included. Information about the technical operation of the CHARACTRON, flow charts, code listings, and explanations of the coding schemes used to generate commands will be included in a further, more technical report. (Author)
AD-650 691 HC$3.00 MF$0.65

INTRODUCTION TO THE THEORY AND APPLICATIONS OF THE REMAPPER.
Final scientific rept.,
Technion - Israel Inst of Tech Haifa Is
F. Ollendorff, and E. Hirsch. 31 Aug 65, 65p
AFCRL-66-41
Contract AF 61 (052)-551
See also AD-611 368.

Descriptors: (*Analog computers, Design), Feedback, Linear programming, Transformations (Mathematics), Digital computers, Mapping (Transformations), Mechanical drawings, Bubble chambers, Photography, Elementary particles, Tracking, Trajectories, Programming (Computers), Israel.

An electronic analog computer is studied, capable of reconstructing figures, graphs, shapes, etc., in three- or higher-dimensional spaces from their two-dimensional projections given in the form of drawings, slides or photographs. The pattern of the reconstructed figure can then be distorted, remapped according to certain transformations, reprojected on desired planes to form new, differently parallaxed pictures of the reconstructed figure, or simply stored in a digital computer memory as a list of coordinates or vector components of points in space, together with their corresponding brightness values. The mathematical basis of this computer is analyzed and some of its applications discussed. The main emphasis is on the study of the application of the computer to the interpretation of bubble-chamber photographs. A new servomechanical feedback circuit developed specifically with a view to this application is also described.
AD-650 718 HC$3.00 MF$0.65

FURTHER DEVELOPMENT OF THE BIOTHERMAL ANALOG COMPUTER.
Washington Univ Seattle Dept of Physiology and Biophysics
For primary bibliographic entry see Field 6B.
AD-650 729 HC$3.00 MF$0.65

DOMAIN WALL STORAGE AND LOGIC DEVICES.
Saskatchewan Univ Saskatoon Dept of Electrical Engineering
A. C. Tickle. 30 Mar 66, 5p
Availability: Published in Proceedings of the joint I.E.R.E-I.E.E. Conference on Applications of Thin Films in Electronic Engineering p1-5, paper no. 8.

Descriptors: (*Shift registers, *Thin film storage devices), Films, Computer logic, Computer storage devices, Ferromagnetic materials, Ferromagnetism, Nickel alloys.

Experimental results are presented for both materials and device aspects of magnetic film shifting registers. For the magnetic films studied the domain wall motion threshold varied according to Neel's 4/3 law and the nucleation threshold according to the Stoner-Wohlfarth switching model. This behaviour enabled films with an increased ratio of nucleation threshold to wall-motion threshold to be produced by increasing the uniaxial anisotropy rather than the film thickness, and yielded increased operating tolerances in magnetic film registers. The principal modes of spurious nucleation and erasure of data-representing domains in shifting registers are described. An interaction between propagating domains is observed which permits the exclusive-OR function and thus makes possible both storage and logic within the same medium. (Author)
AD-650 747 Not available from CFSTI.

LOGISTICS INFORMATION SYSTEMS.
George Washington Univ Washington D C Logistics Research Project
For primary bibliographic entry see Field 15E.
AD-650 748 HC$3.00 MF$0.65

A NONBULK ADDITION TECHNIQUE FOR ASSOCIATIVE PROCESSORS.
Technical rept.,
Northwestern Univ Evanston Ill Information-Processing and Control Systems Lab
S. S. Yau, and C. C. Yang. 17 Sep 66, 6p Rept no. TR-67-107
Contract N00014-66-C-0020-A03, Grant AF-AFOSR-98-65
Revision of manuscript submitted 9 Aug 66.
Availability: Published in IEEE Transactions on Electronic Computers vEC-15 n6 p938-41 Dec 1966.

Descriptors: (*Data processing systems, Computer logic), Computer storage devices, Shift registers, Sequences.

The note presents a nonbulk addition technique which utilizes the sensing process of an associative memory.
AD-650 753 Not available from CFSTI.

A THREE-PHASE POWER SOURCE FOR PARAMETRONS.
Foreign Technology Div Wright-Patterson AFB Ohio
V. E. Obukhov, and A. P. Mikhailenko. 23 Jan 67, 7p Rept no. FTD-HT-66-697
Unedited rough draft trans. of Patent (USSR) 170 765, appl. 830843/26-24, 15 Apr 63.

Descriptors: (*Power supplies, Oscillators), Phase-locked systems, Digital computers, USSR, Patents, Pumping (Electronics).

The patent describes a three-phase power supply for parametrons. The device contains a source of three-phase oscillation cutoff pulses and a source of continuous pumping oscillations. In order to improve the reliability of parametron operation, the unit contains a voltage regulator which is connected to the parametron fixed bias windings. The parametrons are also connected to the source of oscillation cutoff pulses and continuous pumping oscillations. (Author)
AD-650 801 HC$3.00 MF$0.65

SELF-MONITORING, SELF-CORRECTION AND SELF-REPAIR AS MEANS TO IMPROVED RELIABILITY OF COMPLEX DIGITAL SYSTEMS,
Foreign Technology Div Wright-Patterson AFB Ohio
A. N. Radchenko. 25 Jan 67, 23p Rept no. FTD-HT-66-597
TT-67-61603
Samokontrol, Samokorrektsiya i Samoremont Kak Sredstvo Povsheniya Nadezhnosti Slozhnykh Diskretnykh Ustroistv. Unedited rough draft trans. of mono. Avtomatika, Telemekhanika i Priborostroenie, Moscow, 1964 p241-56.

Descriptors: (*Digital computers, *Reliability (Electronics)), Maintenance, Automatic, Programming (Computers), Control systems, Digital systems, USSR, Redundant components.

Correcting codes are used widely for increasing the reliability of communications equipment and digital computers. If the errors do not exceed a certain magnitude, the system does the correcting; however, the reliability emphasis is shifted to the correcting filter, and a defect in the filter may introduce additional perturbations. The present article proposes a method for increasing the reliability of the correcting filters and other devices by means of secondary (internal) coding. The required design redundancy is moderate compared with complete duplication. During the wearing-out process spare components are introduced only for those components which actually went out of operation. The article also discusses the self-diagnosis of possible failures and their self-repair. Mechanical repairs can be avoided by introducing learning matrices and the learning process leads to the establishment of contacts between appropriate bushbars. (Author)
AD-650 804 HC$3.00 MF$0.65

SECURITY AND PRIVACY IN COMPUTER SYSTEMS,
Rand Corp Santa Monica Calif
Willis H. Ware. Apr 67, 31p Rept no. P-3544
Prepared for presentation at the Spring Joint Computer Conference, Atlantic City, N. J., 17-19 Apr 1967.

Descriptors: (*Computers, Control systems), Data processing systems, Classification, Vulnerability, Protection, Remote control systems, Time sharing.

Computer systems operating with classified military information and those handling private or sensitive information are contrasted in terms of: controlling user access; incentives to penetration; hardware requirements; file access and protection; overall philosophy of system organization; certifying authorities; magnitude and seriousness of penetration efforts; security and protection of communication circuits. Generally speaking, similar hardware-software and systems precautions must be taken. The essential distinctions are in the legal framework, value of information, magnitude of resources for both protection and penetration, and in communications security. The all-important difference is that the users of a computer-private network may not be subject to a common authority and discipline, or that these forces may be inadequate to deter deliberate attempts at penetration. (Author)
AD-650 810 HC$3.00 MF$0.65

SUMMARY OF SHORT-PERIOD TERMINAL WEATHER INFORMATION STUDIES.
Travelers Research Center Inc Hartford Conn
For primary bibliographic entry see Field 4B.
AD-650 826 HC$3.00 MF$0.65

HARDWARE DOCUMENTATION OF AN 8-BUTTON KEYBOARD.
Technical rept.,
Columbia Univ Dobbs Ferry N Y Hudson Labs
Charles Amann, and Melvin Klerer. Jan 67, 46p Rept no. TR-127
Contract Nonr-266 (84)

Descriptors: (*Typewriters, *Input-output devices), Computers, Automatic, Wiring diagrams, Programming (Computers), Electronic switches, Electronic relays.
Identifiers: Flexowriters.

If one of eight buttons is depressed this device will emit a serial string of parallel 8-bit codes to cause to set of typing actions in an input-output typewriter terminal. The 'program' for each button is wired in and sequenced by stepping switches.
AD-650 841 HC$3.00 MF$0.65

DETECTION OF ESSENTIAL ORDERING IMPLICIT IN COMPILER LANGUAGE PROGRAMS.
Quarterly progress rept. no. 2, 15 Oct 66-20 Jan 67,
Burroughs Corp Paoli Pa Defense Space and Special Systems Group
Harvey W. Bingham, David A. Fisher, and Warren L. Semon. Feb 67, 41p Rept no. TR-67-1
ECOM-02463-2
Contract DA-28-043-AMC-02463 (E)
See also AD-645 120

Descriptors: (*Compilers, *Programming languages), Digital computers, Context free grammars, Algorithms, Input-output devices, Sequences, Symbols, Iterations.

An investigation was made to determine how implicit parallelism in programs written in compiler languages can be recognized and exploited by machines with highly parallel organizations. An algorithm is described which identifies the complete serial ordering among parts of a program based on the input-output sets of these parts, the ordering given by the programmer, and any known essential order among the program parts. The algorithm is proved and a demonstration given that a minimum number of comparisons of input-output sets are made. Application of the parallel recognition procedure to subroutines, loops, conditionals, recursive subroutines, and serial input-output device calls is explained. The effect of particular features of several compiler languages on parallelism are discussed. These features include loops, transfers of control, conditionals, and conditional sequences. Requirements for replacing iterative loop control by parallel paths of control are given. Alternative algorithms for recognizing essential ordering are suggested which can be executed more effectively on a highly parallel machine. Application of the given algorithm to the syntactic definition of a context-free language is also considered.
AD-650 845 HC$3.00 MF$0.65

SYSTEM IMPLICATIONS OF INFORMATION PRIVACY,
Rand Corp Santa Monica Calif
H. E. Petersen, and R. Turn. Apr 67, 43p Rept no. P-3504
Prepared for presentation at Spring Joint Computer Conference, Atlantic City, N. J. 17-19 Apr 1967.

Descriptors: (*Computers, Control systems), Time sharing, Remote control systems, Protection, Countermeasures, Vulnerability.

Various questions of providing information privacy for remotely accessible on-line, time-shared information systems are explored. Such systems, especially the remote terminals and the communication network, are vulnerable to threats to privacy ranging from accidental dumping of information as a result of hardware or software failures to deliberate penetration using sophisticated equipment. Deliberate attacks are to be expected since payoff from obtained, altered, or erased information could be high. The resources required vary from the cost of a tape recorder to a large investment in equipment and know-how. The protective techniques discussed in this paper include: shielding to reduce electro-magnetic emanations; use of once-only passwords for access control; application of privacy transformations to conceal information in user-processor communications and in data files; recording of attempted penetrations; and systematic verification of the hardware and software integrity. It appears possible to engineer various privacy protection techniques into information systems so that the cost of protection is proportional to the amount received, and is borne largely by those users who desire privacy for their communications and/or files. (Author)
AD-650 847 HC$3.00 MF$0.65

MODIFICATIONS TO PHILO LOGISTICS MODEL. VOLUME I. PROBLEM STATEMENT,
Operations Research Inc Santa Monica Calif
For primary bibliographic entry see Field 15E.
AD-650 854 HC$3.00 MF$0.65

GRAPHICAL-DATA-PROCESSING RESEARCH STUDY AND EXPERIMENTAL INVESTIGATION.
Quarterly rept., no. 4, 1 Nov 66-31 Jan 67,
Stanford Research Inst Menlo Park Calif 0511
R. O. Duda, P. E. Hart, and J. H. Munson. Mar 67, 59p
ECOM-01901-26
Contract DA-28-043-AMC-01901 (E)
Continuation of Contract No. DA-36-039-AMC-03247 (E).
See also AD-645 996.

Descriptors: (*Graphics, *Data processing systems), (*Character recognition, Graphics), (*Learning machines, Character recognition), Classification, Pattern recognition, Programming languages, Syntax, Performance (Engineering), Analysis.

The report describes the continuing development of preprocessing, classification, and context analysis techniques for hand-printed text, which are advancing at an accelerating pace. Experiments were continued with the Piecewise-Linear learning machine, using the outputs of two preprocessors: the PREP 24A simulation of the 1024-image optical preprocessor, and the CALMMASK preprocessor, which employs both edge-detecting and corner-detecting masks. A new low test error rate for classification was achieved on hand-printed alphabets of FORTRAN characters. Statistics of the performance of the learning machine during a single testing iteration are presented, and shed light on several important questions, such as the distribution of rankings of the desired character category when it is not in first place. A discussion of the preprocessing methods used in the topological approach to preprocessing and classification is begun. The initial development of a FORTRAN syntax analyzer is described. A milestone was reached with the passage of a small sample of actual FORTRAN text from a coding sheet through

the scanning, preprocessing, classification, and syntax-analysis programs. (Author)
AD-650 926 HC$3.00 MF$0.65

EXTENSION OF THE GENERAL SENSITIVITY ANALYSIS. VOLUME I. METHODOLOGY.
Research Triangle Inst Durham N C Operations Research and Economics Div
For primary bibliographic entry see Field 15C.
AD-650 927 HC$3.00 MF$0.65

EXTENSION OF THE GENERAL SENSITIVITY ANALYSIS. VOLUME II. TECHNICAL APPENDIXES.
Research Triangle Inst Durham N C Operations Research and Economics Div
For primary bibliographic entry see Field 15C.
AD-650 928 HC$3.00 MF$0.65

EXTENSION OF THE GENERAL SENSITIVITY ANALYSIS. VOLUME III. THE ANCET COMPUTER PROGRAM.
Research Triangle Inst Durham N C Operations Research and Economics Div
For primary bibliographic entry see Field 15C.
AD-650 929 HC$3.00 MF$0.65

DEVELOPMENT OF IMPROVED STRUCTURAL DYNAMIC ANALYSIS. VOLUME II. COMPUTER GRAPHICS.
Lockheed Missiles and Space Co Palo Alto Calif Lockheed Palo Alto Research Lab
For primary bibliographic entry see Field 13M.
AD-650 932 HC$3.00 MF$0.65

SOVIET CYBERNETICS: RECENT NEWS ITEMS, NO. 3,
Rand Corp Santa Monica Calif
Wade B. Holland. Apr 67, 87p Rept no. P-3600/3 TT-67-61648
See also AD-649 251.

Descriptors: (*Computers, USSR), (*Cybernetics, USSR), Information retrieval, Digital computers, Reviews, Computer storage devices, Documentation, Programming languages, Character recognition, Quality control, Production control, Redundant components, Automata.

Contents: Survey of organizations active in automatic character recognition research; Automatic text reading-the LEM textreader; More on the BESM-6 computer, new photos; Dorodnitsyn comments on BESM-6; Type-Z memories - same as linear-selection memories; Type-Z memories - operation; VINITI criticized - need for quality control coordination; Ukrainian scientific research budgets, 1960-65; Production control machines - Minsk-23, Ural-14, requirements for new machines; Symposium on redundancy in information systems; New emphasis on heuristic programming; Comparison of Soviet vs. Western machines; Articles and photographs in the Soviet press.
AD-650 944 HC$3.00 MF$0.65

THE COMING COMPUTER UTILITY--LAISSEZ-FAIRE, LICENSING OR REGULATION,
Rand Corp Santa Monica Calif
Paul Baran. Apr 67, 28p Rept no. P-3466

Descriptors: (*Computers, Control systems), Data processing systems, Time sharing, Law, Communication systems, Economics, Costs, Predictions, Man-machine systems.

We are moving headlong into an era where information processing will be available the same way one buys his electricity. But the attributes that distinguish heterogeneous information from the homogeneous products distributed by the earlier utilities are so different that a fresh regulatory approach is needed for technological progress, safety, and the public interest. We may want to think of this as tomorrow's problem. But tomorrow is here. (Author)
AD-650 945 HC$3.00 MF$0.65

MODULO-m LINEAR SEQUENTIAL CIRCUITS, PARTIAL RESPONSE SIGNALING FORMATS, AND SIGNAL FLOW GRAPHS.
Harvard Univ Cambridge Mass Div of Engineering and Applied Physics
For primary bibliographic entry see Field 9D.
AD-650 958 HC$3.00 MF$0.65

DEVELOPMENT OF DIGITAL COMPUTER PROGRAM FOR STEAM-DRIVEN FREE-PISTON AIR COMPRESSOR.
Technical memo.,
Navy Marine Engineering Lab Annapolis Md
Robert M. Fox. Feb 67, 84p Rept no. MEL-TM-337/66

Descriptors: (*Digital computers, *Computer programs), High-pressure compressors, Mathematical models, Pistons, Compressors, Analysis, Air, Equations, Diagrams, Marine engineering.

A computer program is described that defines the relationship of geometry, motive force, compressed gases, etc, of a mathematical model for an experimental steam-powered, free-piston air compressor currently under development. It provides a detailed breakdown of all forces and kinetics involved in the compressor operation, including their modes of interaction and their effects on compressor performance. (Author)
AD-650 959 HC$3.00 MF$0.65

PATTERN RECOGNITION BY USING AN ASSOCIATIVE MEMORY.
Northwestern Univ Evanston Ill Information-Processing and Control Systems Lab
For primary bibliographic entry see Field 6D.
AD-650 967 Not available from CFSTI.

MULTI-CORE MEMORY MODULE DC TESTER,
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
C. Douglass Locke. 21 Jun 63, 53p Rept no. CF-3036
Contract NOw-62-0604
See also AD-650 993.

Descriptors: (*Computer storage devices, *Test sets), Automatic, Direct current, Data storage systems, Power supplies, Voltmeters, Scanning, Recording systems, Panel boards (Electricity), Test equipment (Electronics).

The system described was designed to provide an automatic D.C. testing device for use with the multicore assemblies used in Satellite memory assemblies. Until now, these assemblies were tested by hand, a rather cumbersome task. Each assembly consists of from 3 to 160 cores, each with several windings, as well as several common windings which traverse the whole assembly of cores. It is very important that each core have an exact ratio of turns for proper operation, thus, for a D.C. test, the system must be extremely sensitive to small changes in resistance. This unit is designed to test all multicore assemblies by changing a programming panel for each different type. Although somewhat limited in its application, because of the reasons outlined in the summary, it does provide a sensitive resistance check of these assemblied. The report describes its operation as assembled presently. (Author)
AD-650 978 HC$3.00 MF$0.65

FABRICATION OF A THIN FILM FULL ADDER,
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
For primary bibliographic entry see Field 9C.
AD-650 980 HC$3.00 MF$0.65

MULTI-CORE ASSEMBLY AUTOMATIC TEST PROGRAM,
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
Patrick T. Komiske. 11 Jul 63, 20p Rept no. CF-3018A
Contract NOw-62-0604
See also AD-650 978.

Descriptors: (*Computer storage devices, Test sets), Automatic, Data storage systems, Voltmeters, Power supplies, Recording systems, Scanning, Panel boards (Electricity), Test equipment (Electronics).

An automatic test system was designed to test electrically the memory multi-core assemblies after each step of the fabrication cycle, i.e., after multicore assembly; resistance-welding of wire to terminals; varnishing; addition of components, matrix, headers; welding; and encapsulation. This is accomplished by performing a continuity (static) test on each multi-core assembly. Each multi-core assembly terminal is checked with a mating terminal for continuity (discontinuity), and each terminal is permutated with an appropriate terminal or series of terminals (phases) to check for opens (normal condition). The number of turns per core (or phases of cores) is determined by accurately measuring resistance. The same test is performed after matrices have been added. At this level-of-testing, the test is expanded. A forward and reverse test on diodes is included. All measurements are in volts. The measured values are converted to ohms for outputting visually, on printed paper, and punched paper tape. Test results are immediately available for comparison with the test specification. (Author)
AD-650 993 HC$3.00 MF$0.65

THEORY OF A PARALLEL-ACTING AUTOMATION.
Technical rept.,
Army Electronics Command Fort Monmouth NJ
S. M. Amoroso, Jan 67, 210p Rept no. ECOM-2794

Descriptors: (*Automation, Theory), Computer logic, Switching circuits, Digital systems.
Identifiers: Sequencial circuits, Sequencial machines.

The report considers first a subclass of deterministic automata which are characterized by master control programs consisting of finite sequences of instructions. Machines of this subclass are called A sub p-machines. After investigating some of the basic properties of these A sub p-machines, it is shown that with respect to the task of string recognition, these automata are weaker than finite automata and equivalent to a variant of k-limited automata. The next subclass of automata considered is characterized by master control programs that are infinite sequences of instructions each composed of a finite initial sequence of instructions followed by a repeating cycle of instructions. Machines of this subclass are called B sub p-machines. It is shown that with respect to the task of producing (defining) sets of strings these machines are equivalent to a number of variant B sub p-machines, and it is shown that an arbitrary recursively enumerable set of strings can be produced on some B sub p-machines. The last subclass of these machines considered is characterized by the introduction of a conditional transfer in the master control programs. It is shown that these automata, that are called C sub p-machines, can compute with a very simple instruction set, any effectively computable function. Then it is shown that either limiting our parallel automata to one-way infinite chains, or to communication with neighboring ma-

chines of the chain in one direction only, does not limit their theoretical processing capabilities. (Author)
AD-651 027 HC$3.00 MF$0.65

A GENERALIZATION OF CONTEXT FREE DETERMINISM,
System Development Corp Santa Monica Calif
Thomas N. Hibbard. 21 Nov 66, 71p Rept no. Scientific-2, TM-738/028/00
AFCRL-67-0077
Contract F19628-67-C-0008, Grant AF-AFOSR-1203-67

Descriptors: (*Automata, Programming (Computers)), Context free grammars, Theory.
Identifiers: Turing machine.

Nondeterministic Turing machines, under the restriction that each square be written on only a fixed number of times, recognize all and only context free languages. The deterministic subclass gives rise to a hierarchical extension of the pushdown deterministic languages. Unambiguity in terms of the machines is the same as grammatical unambiguity. (Author)
AD-651 063 HC$3.00 MF$0.65

ONE-WAY REAL-TIME LIST-STORAGE LANGUAGES,
System Development Corp Santa Monica Calif
Seymour Ginsburg, and Michael A. Harrison. 3 Jan 67, 47p Rept no. Scientific-3, TM-738/029/00
AFCRL-67-0078
Contract F19628-67-C-0008, Grant AF-AFOSR-1203-67
Prepared in cooperation with California Univ., Berkeley.

Descriptors: (*Data storage systems, Programming languages), Automata, Digital computers, Context free grammars, Real time, Computer storage devices.
Identifiers: LISP.

A device is presented which has its memory organized as a list. Attention is then focused on the automaton (called an lsa) which results when the input is read one-way and the device operates in real time. The set of words (called a language) accepted by an lsa is extensively studied. In particular, several characteristics and closure properties of languages are given. (Author)
AD-651 064 HC$3.00 MF$0.65

METHOD OF POTENTIAL FUNCTIONS IN THE PROBLEM OF RECONSTRUCTION OF THE CHARACTERISTIC OF A FUNCTIONAL CONVERTER ACCORDING TO RANDOMLY OBSERVED POINTS,
Foreign Technology Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 12A.
AD-651 091 HC$3.00 MF$0.65

URBAN NODE IN THE INFORMATION NETWORK,
Rand Corp Santa Monica Calif
For primary bibliographic entry see Field 13B.
AD-651 109 Not available from CFSTI.

A FORMAL SYSTEM FOR THE LOGICAL ANALYSIS OF TEMPORAL RELATIONSHIPS BETWEEN INTERVALS OF TIME,
Rand Corp Santa Monica Calif
Robert Mattison. Apr 67, 41p Rept no. RM-5279-PR
Contract F44620-67-C-0045

Descriptors: (*Mathematical logic, Time), (*Data storage systems, *Information retrieval), Minimax technique, Programming (Computers), Language, Linguistics, Semantics, Syntax, Theorems, Mathematical models, Cybernetics.

A formal deduction system is presented for the logical analysis of chronological data (such as before, after, and during relationships). The development of the system was motivated by the requirements of current data-retrieval projects, one of which is RAND's Cybernetics Data-Research Project. A mathematical model of intervals of time is constructed. Twenty basic configurations are used to express all possible time relationships, in which the smallest unit is one calendar day. Axioms are given for making inferences using the Tarski first-order predicate calculus with identity (=), one binary predicate constant (<), meaning wholly before, and two unary operations: min, meaning the beginning of, and max, the end of. Every sentence in this formal language is such that either it or its negation is deducible from the given axioms. Each proper expression is uniquely readable. Semantic and syntactic completeness are demonstrated, the latter by mathematical logic using Kochen's theorems on ultra-products of models. An appendix gives more general axioms that have both the finite intervals of rationals and the finite intervals of reals as models.
AD-651 122 HC$3.00 MF$0.65

A METHOD FOR THE EVALUATION OF SOFTWARE. VOLUME II. PROCEDURAL LANGUAGE COMPILERS -- PARTICULARLY COBOL AND FORTRAN,
Mitre Corp Bedford Mass
Arthur E. Budd. Apr 67, 62p Rept no. MTR-197-Vol-2
ESD-TR-66-113
Contract AF 19 (628)-5165

Descriptors: (*Compilers, Effectiveness), (*Data processing systems, Effectiveness), (*Programming (Computers), Effectiveness), (*Programming languages, Effectiveness), Computers, Computer programs, Input-output devices.
Identifiers: Computer software, Fortran, Cobol.

This report contains procedural language compiler features considered important for comparative anslysis. These features are identified in a form expressly for inclusion in the Three Step Method for Software Evaluation (Volume I, AD-639 586) under Category ONE: Procedural Language Compilers -- Particularly COBOL and FORTRAN. (Author)
AD-651 142 HC$3.00 MF$0.65

THE HYPERSONIC WAKE PROGRAM I. A FORTRAN PROGRAM FOR THE INTEGRAL SOLUTION,
Army Missile Command Redstone Arsenal Ala Advanced Systems Lab
For primary bibliographic entry see Field 20D.
AD-651 159 HC$3.00 MF$0.65

FLOATING-POINT NUMBER REPRESENTATIONS: BASE CHOICE VERSUS EXPONENT RANGE.
Technical rept.,
Stanford Univ Calif Dept of Computer Science
Paul Richman. 28 Apr 67, 38p Rept no. CS-64
Contract Nonr-255 (37)
Supported in part by NSF.

Descriptors: (*Digital computers, *Computer storage devices), Accuracy, Numbers, Set theory, Data storage systems.
Identifiers: Fixed point theorem.

A digital computer whose memory words are composed of r-state devices is considered. The choice of the base, beta, for the internal floating-point numbers on such a computer is discussed. Larger values of beta necessitate the use of more r-state devices for the mantissa, in order to preserve some 'minimum accuracy,' leaving fewer r-state devices for the exponent of beta. As beta increases, the exponent range may increase for a short period, but it must ultimately decrease to zero. Of course, this behavior depends on what definition of accuracy is used. This behavior is analyzed for a recently proposed definition of accuracy which specifies when it is to be said that the set of q-digit base beta floating-point numbers is accurate to p-digits base t. The only case of practical importance today is t = 10 and r = 2; and in this case beta = 2 is always best. However, the analysis is done to cover all cases. (Author)
AD-651 201 HC$3.00 MF$0.65

BROADBAND LASER DIGITAL DEFLECTOR.
Army Electronics Command Fort Monmouth NJ
For primary bibliographic entry see Field 20E.
AD-651 220 HC$3.00 MF$0.65

SNARG-1D A ONE-DIMENSIONAL, DISCRETE-THEORY PROGRAM FOR THE CDC-3600,
Argonne National Lab., Ill.
For primary bibliographic entry see Field 20H.
For abstract, see NSA 21 09.
ANL-7221 HC$3.00 MF$0.65

URANIUM PRICE SCHEDULES BY UCOST CODE COMPUTATION,
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
For primary bibliographic entry see Field 5A.
For abstract, see NSA 21 09.
BNWL-312 HC$3.00 MF$0.65

AUTOMATIC TYPOGRAPHIC-QUALITY TYPESETTING TECHNIQUES: A STATE-OF-THE-ART REVIEW,
National Bureau of Standards, Washington, D. C. Center for Computer Sciences and Technology.
For primary bibliographic entry see Field 14E.
NBS-Mono-99 HC$0.70 MF$0.65

STRUCTURAL ANALYSIS AND MATRIX INTERPRETIVE SYSTEM (SAMIS) PROGRAM REPORT TECHNICAL MEMORANDUM, FEB. 1963-DEC. 1965.
Philco Corp., Palo Alto, Calif. Western Development Labs.
M. Brennan, P. A. Diether, and R. J. Melosh. 15 Dec 66, 210p NASA-CR-83270, JPL-TM-33-307
Contracts NAS7-100, JPL-950321
Prepared for Jpl Revision 1

Descriptors: *Computer program, *Data handling system, *Problem solving, *Structural engineering, Calculation, Computer, Core, Data, Digital, Engineering, Handling, High speed, Instruction, Matrix, Mechanics, Problem, Program, Solution, Structural, Subroutine, Tape.

For abstract, see STAR 05 11.
N67-22062 HC$3.00 MF$0.65

STRUCTURAL ANALYSIS AND MATRIX INTERPRETIVE SYSTEM (SAMIS) PROGRAM TECHNICAL REPORT, FEB. - AUG. 1966.
Philco Corp., Palo Alto, Calif. Western Development Labs.
H. N. Christiansen, and R. J. Melosh. 1 Nov 66, 140p NASA-CR-83269, JPL-TM-33-311
Contracts NAS7-100, JPL-950321
Prepared for Jpl

Descriptors: *Characteristic equation, *Computer program, *Error, *Structural engineering, Beam, Characteristic, Computer, Engineering, Equation, Link, Loading, Mathematics, Mechanics, Model, Program, Rod, Shell, Stiffness, Stress, Structural, Structural analysis, Transformation, Tube.

For abstract, see STAR 05 11.
N67-22063 HC$3.00 MF$0.65

ELDO TECHNICAL REVIEW, VOLUME I, NO. 3.
European Space Vehicle Launcher Development Organization, Paris (France).
For primary bibliographic entry see Field 22D.
For abstract, see STAR 05 11.
N67-22491 HC$3.00 MF$0.65

COMPUTER EXPERIMENTS WITH CHARGED PARTICLES, CHARGED FLUIDS AND PLASMAS - A CLASSIFICATION AND BIBLIOGRAPHY.
Nagoya Univ. (Japan). Research Information Center.
C. K. Birdsall. Dec 66, 29p IPPJ-54

Descriptors: *Bibliography, *Charged particle, *Computer method, *Plasma physics, Application, Charge, Computer, Electric, Field, Fluid, Magnetic, Method, Model, Motion, Particle, Physics, Plasma.

For abstract, see STAR 05 11.
N67-22943 HC$3.00 MF$0.65

DESIGN, DEVELOP AND FABRICATE A FEASIBILITY MODEL OF A FERRIMAGNETIC MEMORY USING AN OPTICAL ACCESSION SYSTEM FOR READ WRITE FUNCTIONS FINAL REPORT.
Sperry Rand Corp., Blue Bell, Pa.
N. Goldberg. 22 Nov 66, 45p NASA-CR-83539
Contract NAS8-20509

Descriptors: *Gadolinium, *Magneto-optic, *Memory storage unit, Aluminum, Design, Feasibility, Garnet, Iron, Magnetic, Memory, Model, Optics, Preparation, Property, Room, Sample, Storage, Temperature, Thermal, Unit.

For abstract, see STAR 05 11.
N67-23266 HC$3.00 MF$0.65

BOOLEAN TRANSLATION OF THE SYMBOLIC DESIGN OF A DIGITAL COMPUTER.
Maryland Univ., College Park. Dept. of Electrical Engineering.
B. D. Mc Curdy. Jan 67, 106p NASA-CR-83542, TR-67-39
Grant NSG-398

Descriptors: *Boolean algebra, *Computer program, Computer, Design, Digital, Language, Logic, Program, Simulation, Table, Translation.

For abstract, see STAR 05 11.
N67-23269 HC$3.00 MF$0.65

DIGITAL ANALOG SIMULATION TECHNIQUES.
Maryland Univ., College Park. Computer Science Center.
Y. Chu. 15 Feb 67, 70p NASA-CR-83551, TR-67-40
Grant NSG-398

Descriptors: *Analog simulation, *Digital simulation, *Problem solving, Computer, Language, Nonlinear, Program, Solution.

For abstract, see STAR 05 11.
N67-23279 HC$3.00 MF$0.65

APPLICATION OF COMPUTERS TO THE FORMULATION OF PROBLEMS IN CURVILINEAR COORDINATE SYSTEMS.
National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
J. C. Howard. Apr 67, 52p NASA-TN-D-3939

Descriptors: *Computer method, *Coordinate system, *Digital computer, *Motion equation, *Tensor analysis, Acceleration, Analysis, Application, Calculus, Component, Computer, Coordinate, Curvilinear, Derivation, Digital, Equation, Formulation, Fortran, Mass, Method, Motion, Orthogonal, Point, System, Tensor, Transformation, Vector, Velocity.

For abstract, see STAR 05 11.
N67-23303 HC$3.00 MF$0.65

A THREE-DIMENSIONAL RAY TRACING COMPUTER PROGRAM.
Institutes for Environmental Research, Boulder, Colo.
For primary bibliographic entry see Field 20N.
PB-174 502 HC$3.00 MF$0.65

A CONSOLE SYSTEM FOR TEXT MANIPULATION AND PAGE COMPOSITION.
Bunker-Ramo Corp., Canoga Park, Calif.
For primary bibliographic entry see Field 5B.
PB-174 518 HC$3.00 MF$0.65

PROGRAM DESCRIPTION THE LOOKUP ADAPTOR (LADAPT) P3 (DLA),
California Univ., Berkeley. Machine Translation Project.
For primary bibliographic entry see Field 5B.
PB-174 558 HC$3.00 MF$0.65

PROGRAM DESCRIPTION THE LOOKUP DICTIONARY PRINT PROGRAM (LPRINT) P4 (DPP),
California Univ., Berkeley. Machine Translation Project.
For primary bibliographic entry see Field 5B.
PB-174 559 HC$3.00 MF$0.65

PROGRAM DESCRIPTION THE LOOKUP PROGRAM (LOOKUP) P5 (DLP),
California Univ., Berkeley. Machine Translation Project.
For primary bibliographic entry see Field 5B.
PB-174 561 HC$3.00 MF$0.65

9C. ELECTRONIC AND ELECTRICAL ENGINEERING

UNIVAC PROCESSING OF THE ELECTRONIC FAILURE TABULATION PROBLEM FOR THE BUREAU OF SHIPS.
David Taylor Model Basin Washington D C Applied Mathematics Lab
For primary bibliographic entry see Field 15E.
AD-650 568 HC$3.00 MF$0.65

A DEVICE FOR AUTOMATICALLY MEASURING THE PARAMETERS OF TUNNEL DIODES,
Foreign Technology Div Wright-Patterson AFB Ohio
E. M. Andrianov, and I. Ya Klyavinsh. 23 Jan 67, 8p Rept no. FTD-HT-66-698
Unedited rough draft trans. of Patent (USSR) 171 449, appl. 834183/26-9 3 May 63.

Descriptors: (*Test equipment (Electronics), *Tunnel diodes), USSR, Patents, Automatic, Ammeters, Measurement, Digital recording systems.

The patent describes a device which automatically measures the parameters of tunnel diodes. The instrument contains a unit which converts the measured values of maximum and minimum current to a dc voltage. A digital printout attachment for recording the converter parameters and a unit which measures diode voltages which correspond to the values of maximum and minimum current are connected through commutators to the conversion unit. The device also contains a control unit and a power supply. Accuracy during automatic measurement of diode parameters is improved by using an automatic compensator in the voltage measurement unit. The compensator is connected to the control unit. The conversion unit has a variable voltage supply connected to its input and a pulse shaper connected to its output. The pulse shaper generates signals which control switching of the measurement and recording instruments. English translation: 4 pages. (Author)
AD-650 800 HC$3.00 MF$0.65

FABRICATION OF A THIN FILM FULL ADDER,
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
Stanley H. Gordon. 6 Apr 62, 41p Rept no. CF-2979
Contract NOrd-7386

Descriptors: (*Microminiaturization (Electronics), *Digital computers), (*Circuits, *Films), Transistors, Resistors, Electrical equipment, Thermal joining, Semiconductor devices, Dielectric films, Electric insulation, Protective treatments, Diagrams.

The report contains Microelectronics and all phases of thin film microelectronic circuit and system fabrication. A block diagram of the digital full adder chosen as a vehicle for this initial effort is shown. Digital circuits lend themselves to present day microelectronic fabrication techniques because of their low power consumption, wide allowable component tolerances and high circuit redundancy. There are no capacitors required in the circuit design chosen. The fabrication of capacitors is not difficult, however, the choice was made to simplify the preliminary investigation. The full adder system to be fabricated consisted of three dual inverters, seven NOR circuits, two OR circuits and two light circuits used to display the output of the digital addition. (Author)
AD-650 980 HC$3.00 MF$0.65

A STUDY OF THE OPERATION OF A PERMANENT MAGNET D. C. MOTOR WITH PULSES,
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
Steven Tretter. Sep 62, 86p Rept no. CF-2999
Contract NOw-62-0604

Descriptors: (*Electric motors, Pulse systems), Performance (Engineering), Direct current, Transients, Transfer functions, Electrical impedance, Pulse modulation, Operation.

A study was made of what happens to a D. C. motor when it is run by pulses. The purpose for making the study was to determine an analytical method of predicting how a D. C. motor would behave when run by pulses so that it would be possible to design systems with motors excited in this manner without using a trial and error method. Transient response, transfer functions, input impedance, power dissipation, and methods of driving the motors are all discussed in the report. Also the frequency spectrums of various waves which might be applied to the motor are derived. These waves include pulse width and pulse amplitude modulated waves. Experimental techniques for measuring transient response and motor parameters are also discussed. (Author)
AD-650 991 HC$3.00 MF$0.65

MEASUREMENT OF THE DIELECTRIC CONSTANT OF ALUMINUM OXIDE.
Texas Univ Austin Defense Research Lab 4410
For primary bibliographic entry see Field 11B.
AD-651 005 HC$3.00 MF$0.65

THE DESIGN AND TESTING OF A UHF PHASE SHIFT RESOLVER.

Technical rept.,
Texas Univ Austin Defense Research Lab
Michael Fischer, Alfred Davis, Jr., and Julian R. Wright. Sep 62, 25p Rept no. DRL-495
Contract NOrd-16498
Prepared in cooperation with Johns Hopkins Univ., Silver Spring, Md., Applied Physics Lab., CF-2998.

Descriptors: (*Phase shift, *Synchros), Ultrahigh frequency, Feasibility studies, Design, Tests, Diagrams.

The design and testing of a UHF resolver with an accuracy (mechanical rotation versus electrical phase shift) of plus or minus two degrees and an insertion loss of 26.8 plus or minus one-half decibel is described. (Author)
AD-651 006 HC$3.00 MF$0.65

FIVE HUNDRED KV LONG-DISTANCE ELECTRIC TRANSMISSION.
Israel Program for Scientific Translations, Ltd., Jerusalem.
A. M. Nekrasov, and S. S. Rokotyan. 1966, 591p
Transl. Into English the Book "dal'nie Elektroperedachi 500kv" Moscow, Izdatel'stvo Energiya, 1964

Descriptors: *Construction, *Electric equipment, *Maintenance, *Structural design, *Transmission line, Arrestor, Capacitor, Circuit, Clearance, Communication, Conductor, Corona, Design, Discharge, Distribution, Electric, Equipment, High voltage, Hydroelectric, Lightning, Line, Loading, Manufacturing, Operation, Overvoltage, Plant, Power, Property, Protection, Stability, Structural, Switching, System, Thermoelectric, Transformer, Transmission.

For abstract, see STAR 05 11.
N67-22181 HC$3.00 MF$0.65

STUDY OF OPTIMAL AND ADAPTIVE CONTROL THEORY FINAL REPORT, MAY 1964 - JUN. 1966.
Alabama Univ. Research Inst., Huntsville.
C. D. Johnson. Apr 67, 121p NASA-CR-7151
Contract NAS8-11231

Descriptors: *Adaptive control, *Launch vehicle, *Optimal control, Adaptive, Canonical problem, Chebyshev approximation, Control, Dynamic, Game, Hyperplane, Linear, Optimal, Problem, Solution, System, Theory, Transformation.

For abstract, see STAR 05 11.
N67-22213 HC$3.00 MF$0.65

CONTRIBUTION TO THE IMPROVEMENT OF ELECTROMECHANICAL RELAYS.
Contribution A L'amelioration des Relais Electromecaniques
Eidgenossische Technische Hochschule, Zurich (Switzerland).
R. Derighetti. 1965, 75p PROM.-3654
in Swiss, English Summary Its Publ.-50

Descriptors: *Electric contact, *Relay, Contact, Device, Electric, High speed, Layer, Liquid, Physical, Property, Surface, Switch.

For abstract, see STAR 05 11.
N67-23000 HC$3.00 MF$0.65

MICROWAVE SIGNAL SOURCE POLARAD 1206 1.95 TO 4.20 GHz.
Bureau of Naval Weapons Representative, Pomona, Calif. Metrology Engineering Center.
For primary bibliographic entry see Field 14B.
PB-174 525 HC$3.00 MF$0.65

MICROWAVE SIGNAL SOURCE POLARAD 1205 0.95 TO 2.40 GHz.
Bureau of Naval Weapons Representative, Pomona, Calif. Metrology Engineering Center.
For primary bibliographic entry see Field 14B.
PB-174 526 HC$3.00 MF$0.65

MICROWAVE SIGNAL SOURCE POLARAD 1207 3.8 TO 8.2 GHz.
Bureau of Naval Weapons Representative, Pomona, Calif. Metrology Engineering Center.
For primary bibliographic entry see Field 14B.
PB-174 527 HC$3.00 MF$0.65

PORTABLE PRESSURE CALIBRATION SYSTEM MODEL 3460 (KING NUTRONICS CORPORATION).
Bureau of Naval Weapons Representative, Pomona, Calif. Metrology Engineering Center.
For primary bibliographic entry see Field 14B.
PB-174 528 HC$3.00 MF$0.65

MICROWAVE SIGNAL SOURCE POLARAD 1208 7.0 TO 11.0 GHz.
Bureau of Naval Weapons Representative, Pomona, Calif. Metrology Engineering Center.
For primary bibliographic entry see Field 14B.
PB-174 529 HC$3.00 MF$0.65

SIGNAL GENERATOR SG-691/ASA-48.
Naval Air Systems Command, Washington, D.C.
For primary bibliographic entry see Field 14B.
PB-174 541 HC$3.00 MF$0.65

CALCUL DU GLISSEMENT DE LA FREQUENCE DE RESONANCE D'UNE CAVITE CHARGEE PAR UN PLASMA EN PRESENCE OU NON D'UN CHAMP MAGNETIQUE STATIQUE (Calculation of the Resonance Frequency Change for a Cavity Charged by a Plasma With or Without a Static Magnetic Field),
Commissariat a l'Energie Atomique, Saclay (France). Centre d'Etudes Nucleaires.
For primary bibliographic entry see Field 20I.
PB-174 571 HC$3.00 MF$0.65

DIFFERENTIAL VOLTMETERS, JOHN FLUKE 801, 801IA, 801R, 801B, 801B/Ag, 801BR, 801BR/AG, 801H, 801H/G, 803, 803R, 803B, 803B/AF, 803/AG, 803BR and 803BR/AG.
Naval Air Systems Command, Washington. D.C.
For primary bibliographic entry see Field 14B.
PB-174 582 HC$3.00 MF$0.65

DIFFERENTIAL VOLTMETERS FLUKE 800 AND 800R.
Bureau of Naval Weapons Representative, Pomona, Calif. Metrology Engineering Center.
For primary bibliographic entry see Field 14B.
PB-174 583 HC$3.00 MF$0.65

SIGNAL GENERATOR SG-47/USM-16 BYRON JACKSON 75.
Lockheed Electronics Co., Clark, N. J.
For primary bibliographic entry see Field 14B.
PB-174 584 HC$3.00 MF$0.65

DEVELOPMENT OF ELECTRICAL CONDUCTING MORTARS,
Bureau of Reclamation, Denver, Colo. Concrete and Structural Branch.
For primary bibliographic entry see Field 11B.
PB-174 595 HC$3.00 MF$0.65

TRUE ROOT-MEAN-SQUARE BALLANTINE 320.
Technical manual instrument calibration procedure, AE-40.
Bureau of Naval Weapons Representative, Pomona, Calif. Metrology Engineering Center.
1 Mar 67, 17p
NAVAIR-17-20AE-40

Descriptors: (*Voltmeters, Calibration), Instruction manuals, Test equipment (Electronics), Test methods.

The procedure describes the calibration of the Ballantine 320 true root-mean-square electronic voltmeter, which measures the true root-mean-square value (effective value) of voltages from 100 microvolts to 320 volts.
PB-174 596 HC$3.00 MF$0.65

9D. INFORMATION THEORY

MODULO-m LINEAR SEQUENTIAL CIRCUITS, PARTIAL RESPONSE SIGNALING FORMATS, AND SIGNAL FLOW GRAPHS.
Technical rept.,
Harvard Univ Cambridge Mass Div of Engineering and Applied Physics
D. W. Tufts, and C. V. Ramamoorthy. Feb 67, 27p Rept no. TR-519
Contract Nonr-1866 (16)
Prepared in cooperation with Honeywell, Inc., Boston, Mass.

Descriptors: (*Circuits, Sequences), Mathematical analysis, Graphics, Linear systems, Information theory, Signals, Data storage systems, Shift registers.

Signal flow graph techniques were developed for the analysis of modulo-m linear sequential circuits and of mixed systems containing both modulo-m adders and adders of real numbers. One of the main results is the proof that the rational generating function of a modulo-m linear sequential circuit can be obtained from the generating function of a topologically similar sampled data system (with integer branch gains) by simply replacing each integer valued coefficient in the latter generating function by its (mod m) equivalent. Besides the direct application to the analysis of modulo m sequential circuits and sequence generators, mixed systems which arise in the partial response signaling format for digital data transmission were also investigated. (Author)
AD-650 958 HC$3.00 MF$0.65

SEMIANNUAL PROGRESS REPORT COVERING PERIOD JULY 1, 1966-DECEMBER 31, 1966.
Harvard Univ Cambridge Mass Div of Engineering and Applied Physics
For primary bibliographic entry see Field 20L.
AD-651 121 HC$3.00 MF$0.65

APPLICATION OF INFORMATION THEORY TO THE NERVOUS SYSTEM.
Chicago Univ Ill Committee on Mathematical Biology
For primary bibliographic entry see Field 6P.
AD-651 123 HC$3.00 MF$0.65

A GEOMETRIC TREATMENT OF THE PROBLEM OF SOURCE ENCODING A GAUSSIAN RANDOM VARIABLE.
California Univ., Berkeley. Space Sciences Lab.
D. J. Sakrison. 31 Jan 67, 21p NASA-CR-83396
Contract NGR-05-003-143
Its Tech. Memo Ser. No. 8, Issue No. 3

Descriptors: *Encoding, *Geometry, *Random variable, Distortion, Equation, Information theory, Optimum, Performance, Problem solving, Random, Source, Treatment, Variable.

For abstract, see STAR 05 11.
N67-22427 HC$3.00 MF$0.65

RESEARCH LABORATORY OF ELECTRONICS QUARTERLY PROGRESS REPORT NO. 84.
Massachusetts Inst. of Tech., Cambridge. Research Lab. of Electronics.
For primary bibliographic entry see Field 20I.
For abstract, see STAR 05 11.
N67-22641 HC$3.00 MF$0.65

ON THE THEORY OF LINEAR NOISY SYSTEMS.
Technische Hogeschool, Eindhoven (Netherlands).
H. Bosma. 1967, 203p

Descriptors: *Linear system, *Radio noise, Communications, Coordinate, Density, Diagonal, Distribution, Exchange, Imbedding, Linear, Mathematics, Matrix, Noise, Performance, Power, Radio, Scattering, Signal, System, Temperature, Transformation.

For abstract, see STAR 05 11.
N67-23099 HC$3.00 MF$0.65

SYSTEM OPTIMIZATION FOR A LARGE INFORMATION COLLECTION SYSTEM SCIENTIFIC REPORT.
Pennsylvania State Univ., University Park. Ionosphere Research Lab.
N. W. Perks. 10 Mar 67, 111p NASA-CR-83546
Grant NSG-134-61
Its Scientific Rept.-292

Descriptors: *Information processing, *Optimization, *Systems analysis, Analysis, Decision, Error, Fading, Information, Loss, Noise, Processing, Random, Symbol, System, White.

For abstract, see STAR 05 11.
N67-23273 HC$3.00 MF$0.65

9E. SUBSYSTEMS

CRYSTAL FILTERS.
Final rept.,
Motorola, Inc., Chicago, Ill.
S. Malinowski, and J. Dailing. 15 Aug 63, 126p
Contract DA-36-039-sc-85300

Descriptors: (*Crystal filters, Very high frequency), Single sideband communication systems, Medium frequency, High frequency, Band-pass filters, Design, Mathematical analysis, Phase Measurement, Measuring devices (Electrical+-electronic). Phase meters, Measurement.
Identifiers: Gaussian filters, Lattice type filters.

This final report terminates a three year investigation concerning the theoretical and practical aspects of various types of crystal filters between 1.75 MC and 70 MC. This report deals with measured data which was obtained on actual filters whose designs were based on the theoretical information developed under this program. This report discusses the following types of crystal filters. 1. Bandpass filters at 30 MC, 2. Bandpass filters at 70 MC, 3. Gaussian filters at 30 MC, 4. Gaussian filters at 70 MC, 5. Single-sideband filters at 1.75 MC, 6. Linear phase filters at 1.75 MC. (Author)
AD-424 041 HC$3.00

SELF- AND MUTUAL- ADMITTANCES OF TWO IDENTICAL CIRCULAR LOOP ANTENNAS IN A CONDUCTING MEDIUM AND IN AIR.
Technical rept.,
Harvard Univ Cambridge Mass Cruft Lab 2208
K. Iizuka, R. W. P. King, and C. W. Harrison, Jr.
14 Feb 66, 20p Rept no. TR-512
Contracts Nonr-1866 (32), AF 19 (604)-7262
Availability: Published in IEEE Transactions on Antennas and Propagation p440-50 Jul 1966.

Descriptors: (*Loop antennas, Admittance), Tables, Graphics, Experimental data.

The normalized self- and mutual admittances of two identical bare circular loop antennas were evaluated when the loops are immersed in either air or an infinite homogeneous conducting medium. By decomposing the voltage and current into symmetric and antisymmetric components, the simultaneous integral equations for the distribution of current along the loop were converted into a single integral equation similar to that for the isolated circular loop antenna which has already been studied. The computed results are presented graphically. The measured results are in good agreement with theory. (Author)
AD-650 640 Not available from CFSTI.

'A CONSTANT BANDWIDTH, WIDE RANGE, TRANSISTORIZED LOGARITHMIC AMPLIFIER'.
Pennsylvania State Univ University Park Ionosphere Research Lab
F. W. Hopwood. 30 Mar 67, 95p Rept no. Scientific-294 (E)
AFCRL-67-0186
Contract AF 19 (628)-4050

Descriptors: (*Logarithmic amplifiers, Transistor amplifiers), Feedback amplifiers, Transfer functions, Frequency modulation, Bandwidth, Tuned amplifiers, Performance (Engineering).

An analysis of the breakpoint conditions necessary to form a constant bandwidth, tuned radio frequency, piecewise logarithmic amplifier is presented. The amplifier uses DC feedback rather than saturation or bias control techniques and the logarithmic transfer function is essentially independent of temperature and transistor parameters. The suitability of the device for pulse operation is considered, along with the effects of low frequency and high frequency modulation, and of operation at frequencies other than resonance. (Author)
AD-650 694 HC$3.00 MF$0.65

RADIO LINKS AND ANTENNAS IN BOUNDLESS OR BOUNDED LOSSY MEDIA.
Istituto Universitario Navale Naples (Italy)
For primary bibliographic entry see Field 17B.
AD-650 719 HC$3.00 MF$0.65

INDUCTIVE STORAGE SWITCH STUDY.
Final rept., Sep 65-Sep 66,
Advanced Kinetics Inc Costa Mesa Calif 05
R. W. Waniek, H. P. Furth, D. M. Fitzgerald, R. T. Givens, and W. Chen. Feb 67, 112p
RADC-TR-66-774
Contract AF 30 (602)-3512

Descriptors: (*Electronic switches, Storage), Liquid metals, Inductance, Energy, Electric discharges, Electrodes, Mercury, Sodium.

The problems encountered when discharging an inductive storage device into a load are discussed in detail. Experiments with a switch using a liquid metal to solid metal contact resulted in electrode erosion which could not be prevented. This led to the exclusive use of liquid electrodes which are self healing. A variety of switch configurations were devised and tested including two types of vertical flow interrupters. Data from these tests which were conducted with both mercury and liquid sodium as the switching medium is presented. (Author)
AD-650 731 HC$3.00 MF$0.65

EXPERIMENTAL INVESTIGATION OF SATURATION EFFECTS IN FERRITE FREQUENCY DOUBLERS.
Stanford Univ Calif Microwave Lab
E. K. Kirchner, H. J. Shaw, and D. K. Winslow.
31 Jan 66, 11p Rept no. ML-1510, Scientific-2
AFCRL-67-0164
Contract AF 19 (628)-5545
Availability: Published in IEEE Transactions on Magnetics vMAG-2 n4 p691-6 Dec 1966.

Descriptors: (*Frequency multipliers, Ferromagnetic materials), Ferrites, Nuclear spins, Ferromagnetism, Pumping (Electronics).

Saturation of ferrite frequency doublers due to the reaction of the generated second-harmonic field back on the sample, the excitation of unstable spin waves by transverse pumping, and the excitation of unstable spin waves by longitudinal pumping is investigated experimentally. An expression for the second-harmonic power as a function of the power absorbed by the ferrite, which holds for any degree of processional motion ellipticity of the magnetization, is derived including the effect of the reaction field. An experimental method of observing the three saturation effects through the introduction of an externally impressed second-harmonic field is described. Experimental observations of all three saturation mechanisms are reported, and the results are compared with theory. The upper bound on conversion efficiency of a ferrite doubler, assuming adequate output coupling circuits can be devised, is set by longitudinally-pumped spin waves. This upper bound on efficiency is measured experimentally for a typical doubler. (Author)
AD-650 755 Not available from CFSTI.

3.2 MILLIMETER WAVE OSCILLATOR.
Quarterly rept. no. 1, 1 Oct-31 Dec 66,
Hughes Research Labs Malibu Calif Chemical Physics Dept
Robert P. Bryan. Mar 67, 22p Rept no. 6
ECOM-02225-6
Contract DA-28-043-AMC-02225 (E)

Descriptors: (*Microwave oscillators, Millimeter waves), (*Klystrons, Millimeter waves), Pulse modulation, Interactions, Magnets, Focusing.

Progress is reported of the development of a permanent-magnet-focused, 10 kW, pulsed, distributed interaction klystron which oscillates at 93.75 GHz and which has been both environmentally and life tested. Efforts are continuing toward the final design of the parmanent-magnet package. The mechanical tuning assembly for the output coupler has been improved, and the electron gun assembly has been made more rugged. Most of the required parts have been received, and construction of the various test vehicles has begun. An experimental tube containing a shorter cavity structure is almost completed. The fabrication has begun of another short pulse modulator needed for the test and evaluation of the tubes. (Author)
AD-650 768 HC$3.00 MF$0.65

OPERATIONAL LOW-POWER, LOW- TO HIGH-FREQUENCY DIGITAL CIRCUIT ELEMENTS: REFINEMENTS, CHARACTERISTICS AND DEVELOPMENTS,
Massachusetts Inst of Tech Lexington Lincoln Lab
Donald E. Chace. 24 Jan 67, 78p Rept no. TN-1967-10
ESD-TR-67-45
Contract AF 19 (628)-5167

Descriptors: (*Relaxation oscillators, Configuration), (*Gates (Circuits), Digital systems), Spacecraft components, Satellites (Artificial), Trigger circuits, Input-output devices, Transistors, Efficiency, Costs, Wiring diagrams, Environment, Systems engineering, Power, Performance (Engineering).

This report contains various configurations of operational low-power digital circuit elements which have been refined and/or developed to carry out

many functional requirements of digital system designs. Although they are primarily intended for use in space-oriented digital system applications, e.g., the Lincoln Experimental Satellite (LES) program, the configurations need not be limited to this purpose. Characteristic operational data are included in all cases to point out various circuit requirements, capabilities and limitations. A myriad of flip-flop configurations is provided to promote efficient systems design in regards to power consumption, noise immunity and cost. Section IV covers some design considerations relating to high-speed, low-power flip-flop development.
AD-650 779 HC$3.00 MF$0.65

A THREE-PHASE POWER SOURCE FOR PARAMETRONS,
Foreign Technology Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 9B.
AD-650 801 HC$3.00 MF$0.65

ELECTROMAGNETIC INTERFERENCE MEASUREMENT METHODS - SHIELDED ENCLOSURE.
Georgia Inst of Tech Atlanta Engineering Experiment Station
For primary bibliographic entry see Field 20N.
AD-650 830 HC$3.00 MF$0.65

EVALUATION OF VHF AND UHF ANTENNA ASSEMBLIES FA-5526, FA-5527, FA-5528.
Final rept.,
National Aviation Facilities Experimental Center Atlantic City N J
Floyd F. Jones. Dec 65, 85p
FAA-RD-65-134

Descriptors: (*Dipole antennas, Performance (Engineering)), Very high frequency, Ultrahigh frequency, Antenna radiation patterns.

An evaluation of developmental models of VHF Antenna Assemblies FA-5526, FA-5527, and UHF Antenna Assembly FA-5528, was conducted to determine their performance characteristics, capabilities, and limitations for utilization in future developmental efforts. The evaluation included the accomplishment of antenna range and flight radiation patterns for each type of antenna, measurements of voltage standing wave ratios, intercoupling measurements between antennas when installed in a hexagonal configuration, and signal intensities received during light aircraft operations, while landing and taking off at airports ranging from eight to fifty-one miles from the antenna test site. It was concluded that, although the FA-5526, FA-5527, and FA-5528 Antenna Assemblies provided adequate overhead coverage, and acceptable isolation between antennas installed in a hexagonal configuration, the large size of the antenna assemblies, initial cost, weight, installation requirements, and siting effect on low angle coverage, reduced the desirability of the antennas for operational application. It was recommended that development efforts be continued with due consideration accorded the overhead coverage provided by the antennas evaluated, and the reduction of cost, size, weight, and installation requirements. (Author)
AD-650 838 HC$3.00 MF$0.65

OPTIMIZED FEEDS FOR THE WIRE-GRIP LENS HF ANTENNA AT THE FAA RECEIVER STATION, MOLOKAI, HAWAII.
Final rept.,
Trg Inc Menlo Park Calif
F. B. Harris, Jr., R. L. Tanner, and E. M. T. Jones. Dec 65, 65p
FAA-RD-65-128
Contract FAA-ARDS-598

Descriptors: (*Antenna feeds, Lens antennas), Optimization, Performance (Engineering), Antenna radiation patterns, Wire, High frequency, Gain, Efficiency, Direction finding, Electromagnetic lenses, Hawaii.

The report describes the development and testing of optimized feeds for the Wire-Grid HF Lens Antenna at the FAA International Flight Service Receiver Station at Molokai, Hawaii. Utilization of these optimized feeds in the lens greatly increases its gain as well as reducing the theoretical azimuth pattern side lobes, particularly at the low frequency end of the HF band. During the course of this program the originally installed Samoa and Nandi-Canton feeds were replaced with optimized feeds. Measurements made on these optimized feeds confirmed their predicted high efficiency of approximately 50 percent. The calculated efficiency of the optimized feeds is greater than that of the originally installed feeds by approximately 10 db at the low frequency end of the band and 8 db at the high frequency end of the band. Using a ground-based transmitter the measured power gain increase of the lens using the optimized feeds was approximately 7 db at the low frequency end of the band and approximately 4 db at the upper end of the band. Measured gain increases more closely approximating the feed efficiency increases would be expected if the ground-based transmitter were replaced with an airborne transmitter located at the elevation angles corresponding to the peak of the lens elevation patterns. (Author)
AD-650 844 HC$3.00 MF$0.65

EVALUATION OF UHF ANTENNA COUPLERS TYPES CU-691/U AND CU-692/U.
Final rept.,
National Aviation Facilities Experimental Center Atlantic City N J
James G. Dong. Nov 65, 42p
FAA-RD-65-124

Descriptors: (*Antenna components, Coupling circuits), (*Antenna feeds, Ultrahigh frequency), Cavity resonators, Antenna radiation patterns, Performance (Engineering), Air traffic control systems, Communication equipment.

Laboratory tests were conducted on UHF Antenna Couplers, Types CU-691/U and CU-692/U to determine their suitability for FAA use. The CU-691/U Coupler was designed for four-channel operation and the CU-692/U, two-channel operation. Both systems employed passive networks comprised of tandem coaxial cavities operating as selective filters. These filters, and a suitable matching network combination, were designed to provide the capability of connecting more than one transmitter and/or receiver to a single antenna. Measurements were made of such operating parameters as VSWR, selectivity, insertion loss, and isolation. Orbital flight patterns of the antenna radiation, when utilizing the Antenna Coupler, Type CU-691/U were also accomplished. Based on the results of the evaluation, it was concluded that the Antenna Couplers, as designed, were suitable for FAA use. It was recommended that the use of these Antenna Couplers be considered in the planning of Remote Communication Air/Ground Systems. (Author)
AD-650 896 HC$3.00 MF$0.65

PROCEEDINGS OF THE SYMPOSIUM ON HYDROGEN THYRATRONS AND MODULATORS (5th) HELD AT FORT MONMOUTH, N. J., 20-22 MAY 1958.
Army Electronics Labs Fort Monmouth N J 31
For primary bibliographic entry see Field 9A.
AD-650 899 HC$3.00 MF$0.65

DEVELOPMENT OF HEATED COMMUNICATIONS ANTENNAS.
Final rept.,
Federal Aviation Agency Washington D C Systems Research and Development Service
Oscar T. Grann, and Ellis E. Shafer. Dec 66, 24p
Rept no. FAA-RD-66-101

Descriptors: (*Antennas, *Heaters), Communication equipment, Ultrahigh frequency, Silicone plastics, Heating elements, Ice, Standing wave ratios.

Methods to reduce communications antenna icing were investigated. As a result of the investigation a new high-gain UHF antenna was developed and electrical heating elements have been developed for application to swastika and disc-cone antennas presently in use. A brief history of the antenna icing problem is included in this report. The electrical heating elements developed for application to presently used antennas are made of silicone rubber. They are relatively inexpensive and do not affect the radiation pattern or radiation impedance of the antenna. Three different types of heaters are available for application to swastika and disc-cone type antennas which experience severe icing problems in many locations. They have been field tested and found to be effective in reducing the formation of ice on the antennas. The new high-gain UHF antenna has heating elements imbedded in a fiber-glass radome. It also utilizes vertical radiation pattern compression with a slight beam uptilt to increase coverage. This antenna has also been field tested and found to be effective in preventing antenna icing and in providing improved coverage. (Author)
AD-650 916 HC$3.00 MF$0.65

OFFSET MARKER BEACON ANTENNA.
Final rept.,
Airborne Instruments Lab Deer Park N Y 3302
George Skahill. Feb 66, 25p
FAA-RD-65-88
Contract FA-WA-4523

Descriptors: (*Radar antennas, *Radar beacons), Antenna arrays, Yagi antennas, Antenna radiation patterns, Radar landing control, Instrument landings, Glide path systems.

A broadside array of Yagi antennas was developed to supply radiation characteristics suitable for proper Marker Beacon performance for offset distances up to one mile. The design criteria, construction, tests, and installation requirements are described. (Author)
AD-650 921 HC$3.00 MF$0.65

EXPERIMENTAL BAND-PASS LIMITER ENVELOPE DISTRIBUTIONS AND STATISTICS.
Technical rept.,
Harvard Univ Cambridge Mass Div of Engineering and Applied Physics
Donald W. Tufts, and Paul Trafton. Jan 67, 36p
Rept no. TR-523
Contracts Nonr-1866 (16), Nonr-1866 (07)

Descriptors: (*Demodulators, Limiters), Statistical analysis, Experimental data, Radiofrequency interference, Predictions, Band-pass filters, Detectors.

A method is developed for approximately predicting the mean and standard deviation of the output of a detection system consisting of a band-pass limiter followed by an envelope detector. The input to the system consists of a sinusoidal signal plus Gaussian noise plus sinusoidal interference. These results are used to predict detection and false alarm probabilities. Experimental data is presented and compared with predicted results. (Author)
AD-650 946 HC$3.00 MF$0.65

MEASUREMENT OF THE THICKNESS OF THIN FILMS BY MULTIPLE BEAM INTERFEROMETRY,
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
Dean Pappas. 26 Dec 62, 40p Rept no. CF-3003
Contract NOw-62-0604

Descriptors: (*Microminisiturization (Electronics), *Films), (*Interferometers, Measurement), Deposition, Thickness, Monochromatic light, Circuits, Silicon compounds, Chromium.

A Multiple-Beam Interferometer was developed for the measurement of the thickness of vacuum deposited thin films. The thicknesses measured were in the region of 1000 to 10,000 Angstroms. Both Monochromatic Fizeau fringes of equal thickness and heterochromatic fringes of equal chromatic order were investigated, but the latter method was chosen for the actual measurements because of its greater accuracy and less stringent experimental requirements. Five SiO films and one Cr film were measured. Two of the SiO films were deposited simultaneously and the measured thicknesses of these were used to evaluate the uniformity of the deposition. The fringes of equal chromatic order were also used to investigate the reflection phase dispersion by the Al overcoats on the SiO films and by the Cr overcoat on the Cr film. The functional form of this phase dispersion determines whether or not a simple formula for the thickness computation is valid. (Author)
AD-650 987 HC$3.00 MF$0.65

THIN FILM ELECTRONIC AMPLIFIERS.
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
David Abraham. 13 May 63, 42p Rept no. CF-3029
Contract NOw-62-0604

Descriptors: (*Amplifiers, *Electronic equipment), (*Films, *Microminiaturization (Electronics)), Circuits, Semiconductor devices, Resistors, Transistors, Dielectric films.

Thin film microelectronics will perform a wide variety of functions with the advent of a suitable thin film electronic amplifier. The emission amplifier proposed by Mead is not suitable because: Most of the emitted electrons experience collisions in the dielectric film between the emitting surface and the control element, thus losing energy and failing to reach the collector; and the collector current densities required to provide reasonable gain-bandwidth products will inevitably give rise to very large power densities to be thermally dissipated within the device. The thin film triode constructed by Weimer is promising because it has a favorable geometry. The interelectrode capacitances can be kept very small and the gain-bandwidth product is limited principally by the minimum separation between source and drain electrodes. Available technology for producing that gap would indicate the possibility of achieving gain bandwidth products in the range of 100,000,000 - 1,000,000,000 cycles/sec. Single crystal thin film semiconductor devices are attractive but the methods required for the formation of such crystals require very high temperatures which impose strict limitations on substrates and the sequence of circuit production. (Author)
AD-650 994 HC$3.00 MF$0.65

A HIGH SPEED ELECTRONIC SWITCH FOR BI-POLAR ANALOGUE SIGNALS.
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
J. F. Gulick. 15 Jul 63, 12p Rept no. CF-3044
Contract NOw-62-0604

Descriptors: (*Electronic switches, *Transistors), Analog systems, Signals, Circuits, Sensitivity, Data processing systems, Voltage.

An RF oscillator is used to supply an inductively coupled signal to a pair of switching transistors. The switch produced by this technique may remain in the open or closed state indefinitely and has floating 'contacts' for use with ungrounded circuits. (Author)
AD-651 008 HC$3.00 MF$0.65

MICROWAVE DETECTORS USING HOT CARRIER EFFECTS.
Technical rept.,
Army Electronics Command Fort Monmouth NJ
Frank A. Brand, Wesley G. Matthei, Joseph J. Baranowski, and Ivan L. Chase. Feb 67, 34p
Rept no. ECOM-2797

Descriptors: (*Demodulators, Microwave frequency), (*Semiconductor devices, Demodulators), Carriers (Semiconductors), Silicon, Band theory of solids, Seebeck effect, Microwaves, Performance (Engineering).

A new class of solid state microwave detectors based upon the hot carrier properties of majority carriers in germanium has been recently described by Harrison and Zucker. Hot carrier detectors are based upon the nonequilibrium carrier distribution which results when an incident microwave field accelerates the free carriers so that they acquire more energy than the lattice in which they reside. These hot carriers, out of equilibrium with the lattice, give rise to a thermoelectric voltage which is proportional to the incident R.F. field. This report describes the design, fabrication, and performance of hot carrier detectors using high resistivity silicon and bonded point contacts. Direct-current characteristics as well as R.F. properties in the range from 1-10 GHz are described. Of particular interest are power sensitivity, dynamic range, and power handling capability. (Author)
AD-651 023 HC$3.00 MF$0.65

SEMIANNUAL PROGRESS REPORT COVERING PERIOD JULY 1, 1966-DECEMBER 31, 1966.
Harvard Univ Cambridge Mass Div of Engineering and Applied Physics
For primary bibliographic entry see Field 20L.
AD-651 121 HC$3.00 MF$0.65

RADIATION EFFECTS ON THIN-FILM INTEGRATED CIRCUIT ELEMENTS.
North American Aviation Inc Anaheim Calif Autonetics Div
For primary bibliographic entry see Field 18H.
AD-651 144 HC$3.00 MF$0.65

TABULATED DATA ON MATRIX RELATIONSHIPS IN ELECTRONIC TWO-PORT NETWORKS.
Royal Aircraft Establishment, Farnborough (England).
G. Brown, and G. May. Aug 66, 13p RAE-TR-66253

Descriptors: *Matrix algebra, *Network synthesis, Activity, Algebra, Computation, Convention, Current, Data, Electronic, Engineer, Equation, Feedback, Linear, Matrix, Network, Parameter, Passive, Port, Synthesis, System, Tabulation, Two.

For abstract, see STAR 05 11.
N67-22487 HC$3.00 MF$0.65

SOME REMARKS ON THE PHASE-LOCK LOOP.
European Space Vehicle Launcher Development Organization, Paris (France).
E. Cambi. 1966, 12p
P 233-244 Refs (See N67-22491

Descriptors: *Phase lock, *Servo loop, *Wiener filter, Circuit, Detector, Environment, Filter, Integrator, Lagrange multiplier, Lock, Loop, Noise, Optimization, Oscillator, Phase, Servo, Transducer.

For abstract, see STAR 05 11.
N67-22495 HC$3.00 MF$0.65

A CLASS ' A' D.C. COUPLED POWER AMPLIFIER.
Royal Aircraft Establishment, Farnborough (England).
C. W. Skingle, and G. A. Taylor. Jul 66, 42p
RAE-TR-66231

Descriptors: *Amplifier design, *Current amplifier, *Direct current (dc), *Transistor amplifier, *Vibration testing machine, Amplifier, Circuit, Coupled, Current, Design, Direct, Feedback, High, Impedance, Low, Machine, Output, Phase, Power, Resistance, Resonance, Response, Shift, Testing, Transistor, Vibration.

For abstract, see STAR 05 11.
N67-22923 HC$3.00 MF$0.65

MICROWAVE RECEIVER SYSTEM WITH DEGENERATE PARAMETRIC PREAMPLIFIER.
Mikrowellenempfangssyste
m Mit Einem Degenerierten Parametrischen Vorverstaerker
Eidgenossische Technische Hochschule, Zurich (Switzerland).
E. Wildhaber. 1965, 28p PROM.-3724
in Swiss

Descriptors: *Degeneration, *Microwave circuit, *Preamplifier, Band, Bandwidth, Circuit, Construction, Design, Frequency, Microwave, Network, Noise, Parameter, Region, Side, Upper, Waveguide.

For abstract, see STAR 05 11.
N67-23006 HC$3.00 MF$0.65

POWER ANGLE REGULATION FOR SYNCHRONOUS MACHINES.
Polradwinkelregelung Fuer Synchronmaschinen
Royal Aircraft Establishment, Farnborough (England).
D. Ernst, and H. Waldmann. Nov 66, 22p RAE-LIB-TRANS-1192
Transl. Into English From Elektrizitaetswirtschaft (Frankfurt), V. 64, 1965 P 121-127

Descriptors: *Regulator, *Synchronous motor, Angle, Control, Design, Device, Excitation, Machine, Motor, Network, Operation, Power, Supply, Synchronous, Voltage.

For abstract, see STAR 05 11.
N67-23083 HC$3.00 MF$0.65

HALF MILLIMETER BACKWARD WAVE OSCILLATOR TECHNICAL PROGRESS REPORT, 1 JUL. - 30 SEP. 1966.
Centre de Physique Electronique Et Corpuscplaire, Orsay (France).
Oct 66, 15p WR-1638, RADC-TR-67-31
Contract AF 61/052/-814

Descriptors: *Backward wave oscillator, *Submillimeter wave, Backward, Beam, Electron, Field, Gun, Level, Magnetic, Oscillator, Power, Submillimeter, Transmission, Tube, Wave.

For abstract, see STAR 05 11.
N67-23140 HC$3.00 MF$0.65

9F. TELEMETRY

ELDO TECHNICAL REVIEW, VOLUME I, NO. 3.
European Space Vehicle Launcher Development Organization, Paris (France).
For primary bibliographic entry see Field 22D.
For abstract, see STAR 05 11.
N67-22491 HC$3.00 MF$0.65

THE USE OF A PARITY BIT IN A TELEMETRY SYSTEM.
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
W. Miller, R. Muller, and J. Yagelowich. Mar 67, 16p NASA-TM-X-55744, X-562-67-123

Descriptors: *Bit synchronization, *Parity, *Pulse code modulation (pcm), *Telemetry, Bit, Code, Curve, Diagram, Error, Modulation, Performance, Probability, Pulse, Synchronization, System, Timing.

For abstract, see STAR 05 11.
N67-22877 HC$3.00 MF$0.65

10. ENERGY CONVERSION (NON-PROPULSIVE)

10A. CONVERSION TECHNIQUES

RESEARCH IN THE CONVERSION OF VARIOUS FORMS OF ENERGY BY UNCONVENTIONAL TECHNIQUES STATUS REPORT.
Pennsylvania Univ., Philadelphia. Inst. for Direct Energy Conversion.
Mar 67, 129p NASA-CR-83320, INDEC-SR-11
Grant NSG-316

Descriptors: *Electrochemistry, *Energy conversion, *Plasma physics, *Thermoelectricity, Cathode, Cell, Centrifuge, Conversion, Diffusion, Electrolyte, Energy, Engineering, Fuel, Function, Material, Physics, Plasma, Ray, Science, Thermal, Tube, Wave, Work.

For abstract, see STAR 05 11.
N67-22161 HC$3.00 MF$0.65

ELECTROCHEMICAL NUCLEAR ENERGY CONVERTER.
Elektrochemische Kernenergie-konverter
Kernforschungsanlage, Juelich (West Germany). Institut Fuer Physikalische Chemie.
G. Grueneberg. Jan 64, 48p JUL-144-PC
in German, English Summary

Descriptors: *Electrochemistry, *Energy conversion, *Galvanic cell, *Nuclear energy, *Uranium 235, Bibliography, Cell, Chemical, Conversion, Energy, Galvanic, Ion, Nuclear, Oxygen, Ozone, Physical, Radiation, Reactor.

For abstract, see STAR 05 11.
N67-22468 HC$3.00 MF$0.65

ELECTROCHEMICAL HEAT CONVERTER.
Elektrochemische Waermekonverter
Kernforschungsanlage, Juelich (West Germany). Institut Fuer Physikalische Chemie.
G. Grueneberg. Apr 64, 31p JUL-170-PC
in German, English Summary

Descriptors: *Conversion, *Electricity, *Electrochemistry, Cell, Change, Electrode, Electrolyte, Galvanic, Generator, Heat, Magnetohydrodynamic, Physical, Temperature, Thermionic.

For abstract, see STAR 05 11.
N67-22469 HC$3.00 MF$0.65

THERMIONIC.
Kernforschungsanlage, Juelich (West Germany).
For primary bibliographic entry see Field 18I.
For abstract, see STAR 05 11.
N67-22922 HC$3.00 MF$0.65

THE THERMIONIC DIODE AS DIRECT CONVERTERS OF HEAT INTO ELECTRICAL ENERGY.
Die Thermionische Diode Als Dikektumwandler Von Waerme in Elektrische Energie
Kernforschungsanlage, Juelich (West Germany). Arbeitsgruppe Institut Fuer Technische Physik.
E. A. Niekisch, and E. Preuss. Apr 65, 35p JUL-262-TP
in German

Descriptors: *Energy conversion efficiency, *Optimization, *Thermionic diode, Cathode, Cesium, Condensation, Conversion, Current, Diode, Efficiency, Electrode, Electron, Energy, Heat, High temperature, Increase, Literature, Material, Nuclear, Thermal, Thermionic.

For abstract, see STAR 05 11.
N67-23024 HC$3.00 MF$0.65

COMPRESSOR RESEARCH PACKAGE FOR RESEARCH AND DEVELOPMENT OF HIGH PERFORMANCE AXIAL-FLOW TURBOMACHINERY FINAL REPORT.
Pratt and Whitney Aircraft, East Hartford, Conn.
R. Cohen, W. K. Gilroy, and R. D. Marchant. Mar 67, 97p NASA-CR-54884, PWA-2933
Contract NAS3-4179

Descriptors: *Axial flow compressor, *Brayton cycle, *Compression testing machine, *Turbomachine, Aerodynamic, Axial, Axial flow, Compression, Compressor, Configuration, Design, Flow, Machine, Mechanical, Package, Performance, Research, Rig, Rotor, Testing.

For abstract, see STAR 05 11.
N67-23341 HC$3.00 MF$0.65

L'ELECTROHYDRODYNAMIQUE: U N PROCEDE DE CONVERSION DIRECTE D'ENERGIE A HAUTE TENSION (Electrohydrodynamics: A High-Tension Direct Energy Conversion Process).
Commissariat a l'Energie Atomique, Grenoble (France). Centre d'Etudes Nucleaires.
Serge Brun. Apr 67, 51p CEA-R-3158
Text in French; attached summary in English.

Descriptors: (*Plasma generators, Energy conversion), (*Van de Graaff generators, Energy conversion), Theory, Construction, Electrostatics, Plasma medium, Gas ionization, Kinetic energy, Electricity, Plasma engines, France.
Identifiers: Electrohydrodynamic generators.

This analysis consists of a theoretical and practical study of a high-tension electrical power generator based on the Van de Graaff generator principle, the main difference being that the charges produced are transported by a gas in motion and not by a belt. The electrical and thermal properties of such a generator are studied, as well as the difficult problem of the production of the ionised particles used in the conversion. A certain number of results already published on this process for converting kinetic energy into electrical energy is given, as well as some possible applications in the field of space technology. (Author)
PB-174 575 HC$3.00 MF$0.65

10B. POWER SOURCES

FUEL CELL FUEL STUDIES.
Interim technical rept. no. 2, 10 Jul 66-10 Jan 67,
Esso Research and Engineering Co Linden N J Government Research Lab
William J. Asher, Robert H. Shabaker, and Carl E. Heath. Feb 67, 75p Rept no. GR-1-FCF-67
Contract DA-44-009-AMC-1484 (T)

Descriptors: (*Fuel cells, Operation), (*Hydrocarbons, Fuel cells), (*Fuels, Purification), Jet engine fuels, Fuel oil, Absorption, Aromatic compounds, Cycloalkanes, Catalysts, Hydrogen, Separation, Porous metals, Palladium, Hydroforming (Chemical), Diffusion, Ion exchange.

Processes to remove jet fuel components harmful to fuel cell performance were tested in simulated and actual cyclic operation using improved molecular sieves. Improved aromatic absorption performance on the lithium X sieve was achieved by pretreating the sieve with high water loading at elevated temperatures. The adsorption performance of processes using displacing agents, as opposed to burning, for desorption was simulated by preloading sieves with displacing agents. An investigation was also made of the feasibility of reforming high molecular weight fuels in the liquid phase for hydrogen generation for fuel cells. The effects of temperature, pressure, hydrocarbon and water feed rates, hydrocarbon drop size and catalyst geometry on the performance of a fixed bed liquid phase reforming reactor were examined. Good selectivity for hydrogen production has been achieved at low hydrocarbon conversion levels. Preliminary data on the use of palladium diffusers to separate the hydrogen product directly from the condensed phase stream leaving the reforming reactor show substantially lower hydrogen extraction rates are obtained from the liquid phase reformer effluent compared with diffusion from a clean hydrogen stream.
AD-650 580 HC$3.00 MF$0.65

A THREE-PHASE POWER SOURCE FOR PARAMETRONS.
Foreign Technology Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 9B.
AD-650 801 HC$3.00 MF$0.65

MAGNETOHYDRODYNAMIC GENERATOR.
Foreign Technology Div Wright-Patterson AFB Ohio
V. N. Garbuzov, V. A. Parkhomenko, and V. E. Strizhak. 5 Dec 66, 7p Rept no. FTD-HT-66-602
Magnito-gidrodinamicheskii Generator. United rough draft trans. of Patent (USSR) 175583, appl. 905570/26-25, 5 Jun 1964.

Descriptors: (*Magnetohydrodynamic generators, Design), Hall effect, Electric fields, Patents, USSR.

A magnetohydrodynamic conduction-type generator that uses the Hall effect is described. The generator channel is constructed of alternating metal and insulating frames arranged at an angle to the generator axis to improve operational dependability of the generator.
AD-650 802 HC$3.00 MF$0.65

SOME EFFECTS OF ELECTRON IRRADIATION AND TEMPERATURE ON SOLAR CELL PERFORMANCE.
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
J. H. Martin, J. W. Teener, and E. L. Ralph. 15 May 63, 21p Rept no. CF-3028
Contract NOw-62-0604
Prepared in cooperation with Heliotek Div., Textron Electronics, Inc.

Descriptors: (*Solar cells, Electron bombardment), Silicon, Semiconductors, Carriers (Semiconductors), Performance (Engineering), Temperature, Degradation, Space environmental conditions.

The ANNA 1B geodetic satellite was launched into a 600 nautical mile, 50 degree inclination orbit on October 31, 1962. Portions of VI curves of the flashing light circuit were subsequently determined from telemetry records. These data are presented as the solid line portions of Figure 1 for two days and for 29 days after launch. Examination of these

curves indicates the change in both voltage and current which occur after irradiation. The effect of temperature is also indicated. Therefore, a study of solar cell performance after irradiation and as a function of cell temperature was undertaken. A quantitative analysis of these effects is presented, compared with experimental results and the design capabilities of these techniques evaluated.
AD-651 013 HC$3.00 MF$0.65

DEVELOPMENT OF GENERATOR DIRECT CURRENT G-63 0/G (HAND CRANKED).
Final rept. no. 2, 8 Jul 65-15 Nov 66,
Varo Inc Santa Barbara Calif Electrokinetics Div
K. J. Widiner. Mar 67, 60p
ECOM-01605-F
Contract DA-28-043-AMC-01605 (E)

Descriptors: (*Hand generators, Direct current), (*Battery chargers, Hand generators), Design, Drives, Portable, Military requirements.

The Generator, Direct Current, G-63 ()/G developed encompasses the requirements of USAEC-OM Technical Requirement SCL 7828. Major component or subassembly areas involved with unit development may be classified as: Alternator and associated circuitry, mechanical drive, housing, and base assembly. Electrical subsystem development included alternator optimization, rectifier selection, and design of protection and electrical output monitoring circuitry. Mechanical drive development involved matching the harmonic drive to alternator requirements and additional testing required to isolate and rectify problems of low drive efficiency and high acoustic noise levels generated. The housing was developed for minimum size and weight for containment of the alternator-drive subassembly and maximum acoustic noise suppression. The mounting base assembly developed includes consideration for universal functioning and prime factors of weight, strength, and attachment. Techniques were considered and implemented throughout the project to promote economical use of parts and fabrication processes. Use of standard parts and components where possible and joining major subassemblies such as housing and base components with the dip brazing process have been incorporated toward an economy which may become even more significant in mass production considerations. Overall unit considerations resulted in an effort to integrate individual subsystem attributes into an economical unit incorporating factors contributing to operator efficiency for total operation and observation as encountered under field conditions. (Author)
AD-651 070 HC$3.00 MF$0.65

INVESTIGATION OF MECHANISMS FOR ELECTROCHEMICAL CATALYSIS.
Quarterly rept. no. 3, 1 Nov 66-31 Jan 67,
Pratt and Whitney Aircraft East Hartford Conn
John R. Aylward, and Stanley W. Smith. May 67, 25p Rept no. PWA-3051
ECOM-02205-3
Contract DA-28-043-AMC-02205 (E)
See also AD-647 788.

Descriptors: (*Fuel cells, Catalysts), (*Catalysts, Silicides), (*Silicides, Catalysis), Electrochemistry, Electrodes, Titanium compounds, Tungsten compounds, Tantalum compounds, Molybdenum compounds, Vanadium compounds, Substrates, Gold, Platinum, Doping, Hydrogen, Methanols, Oxidation, Electrolytes, Corrosion.
Identifiers: Tantalum silicides, Titanium silicides, Tungsten silicide.

A program is being conducted to investigate the mechanisms of electrocatalysis with respect to the anodic oxidation of selected fuels by novel electrocatalysts in acid electrolyte at temperatures below 150C and at ambient pressure. Conflicts had occurred in the data for silicides incorporated on gold and gold-plated current collectors, but investigation during the current quarter indicates that the conflicts resulted from platinum contamination. The study also showed that TiSi2 exhibits some activity for hydrogen and methanol oxidation. The electrochemical behavior of WSi2 in acid electrolyte was studied and was found to be similar to that of MoSi2. Both of these materials have tetragonal structures. VSi2 and TaSi2 have similar electrochemical characteristics and both have hexagonal structures. Experiments with platinum-doped TiSi2 electrodes indicates that relatively large amounts of platinum are required to obtain a catalytic activity which approaches that of an equivalent platinum sheet and that the utilization of the platinum is low. However, gold-platinum co-deposits on TiSi2 exhibit markedly different behavior. The current obtained from the co-deposits as the ratio of gold to platinum was varied shows maxima at 50 and 70 weight percent of gold and a sharp minimum at 55 weight percent of gold. The maxima are higher than the levels of activity obtained with platinum alone. (Author)
AD-651 194 HC$3.00 MF$0.65

RELIABILITIES OF REDUNDANT ELECTRICAL GENERATOR SYSTEMS.
Aerojet-general Corp., Azusa, Calif.
For primary bibliographic entry see Field 18N.
For abstract, see STAR 05 11.
N67-22854 HC$3.00 MF$0.65

FEASIBILITY STUDY OF ROTATING BOILER FOR HIGH-PERFORMANCE RANKINE CYCLE POWER GENERATION SYSTEMS.
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
V. H. Gray. 1967, 15p NASA-TM-X-52281
for Presentation At the Intersoc. Energy Conversion Conf., Miami Beach, Fla., 14-17 Aug. 1967

Descriptors: *Boiler, *Power generator, *Rankine cycle, *Rotating machine, Coefficient, Feasibility, Generator, Heat transfer, Interface, Liquid, Machine, Power, Quality, Rotation, Stability, Test, Vapor.

For abstract, see STAR 05 11.
N67-23313 HC$3.00 MF$0.65

EXPERIMENTAL STUDIES OF CAVITATION DAMAGE IN ALKALI METAL PUMPS FOR APPLICATION IN SPACE POWER SYSTEMS.
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
C. H. Hauser. 1967, 25p NASA-TM-X-52286
for Presentation At the Symp. on Testing Tech. in Ship Cavitation Res., Trondheim, Norway, 31 May - 2 Jun. 1967

Descriptors: *Al li metal, *Cavitation, *Hydraulic pump, *Liquid metal, Alkali, Axial, Control, Damage, Effect, Flow, Fluid, Hydraulic, Impeller, Liquid, Magnetostriction, Metal, Mixing, Potassium, Property, Pump, Sodium, Vibrator.

For abstract, see STAR 05 11.
N67-23316 HC$3.00 MF$0.65

GENERATION OF LONG TIME CREEP DATA ON REFRACTORY ALLOYS AT ELEVATED TEMPERATURES QUARTERLY REPORT, 26 OCT. - 26 DEC. 1966.
TRW Equipment Labs., Cleveland, Ohio. Materials Research and Development Dept.
For primary bibliographic entry see Field 11F.
For abstract, see STAR 05 11.
N67-23323 HC$3.00 MF$0.65

10C. ENERGY STORAGE

DEVELOPMENT OF THE HIGH RATE METAL-AIR DEPOLARIZED BATTERIES.
Rept. no. 5, 1 Jul 65-30 Sep 66 (Final),
Yardney Electric Corp New York
Ray Blossom. Mar 67, 56p
ECOM-01614-5
Contract DA-28-043-AMC-01614 (E)
See also AD-644 366.

Descriptors: (*Primary cells, *Electrodes), Air, Reduction (Chemistry), Polarization, Gas flow, Heat transfer, Cathodes (Electrolytic cell), Zinc, Electrical properties, Construction, Performance (Engineering).
Identifiers: Zinc-air cells.

The goal of this contract was the development of a 32 volt - 10 watt primary metal-air battery with a specific energy in excess of WH/lb. The principal work was an investigation of zinc, magnesium, aluminum, calcium, and barium electrodes coupled with an air reducing cathode in aqueous electrolyte systems. This study included the discharge performance of the above cells at various current densities over a temperature range of -25F to +125F. During the fifth, and final, quarterly period the relationship between air supply and metal-air cell behavior was studied. Experimental air polarization data obtained from this study are given. From the heat transfer analysis of these data, a method of correlating cell pack temperature with the convective air flow rate was derived. Zinc-air gave best discharge performance over the current density and temperature range investigated. Of the group of cell systems studied, zinc-air was the only metal-air cell which met ECOM requirements for the 32 volt battery. Six 26 cell - 16 AH zinc-air batteries were fabricated. Construction and performance details are given. (Author)
AD-650 780 HC$3.00 MF$0.65

RESEARCH AND DEVELOPMENT OF THE DRY TAPE BATTERY CONCEPT QUARTERLY REPORT, 9 JUN. - 9 SEP. 1966.
Monsanto Research Corp., Everett, Mass. Boston Lab.
A. S. Borsanyi, J. S. Driscoll, and D. L. Williams. 31 Dec 66, 58p NASA-CR-72170, MRB5010Q5
Contract NAS3-7624

Descriptors: *Battery, *Cathode, *Energy density, Anode, Cell, Chamber, Couple, Current, Density, Discharge, Dry, Electrolyte, Energy, Oxygen, Tape, Test, Voltage.

For abstract, see STAR 05 11.
N67-22069 HC$3.00 MF$0.65

LOW TEMPERATURE BATTERY QUARTERLY REPORTS, 14 MAR. - 13 SEP. 1966.
Livingston Electronic Corp., Montgomeryville, Pa.
G. M. Armstrong. 13 Sep 66, 117p NASA-CR-72172, QR-2
Contract NAS3-8503

Descriptors: *Battery, *Electrochemical cell, Ammonium, Cell, Characteristics, Cyanide, Electrochemical, Equipment, Low temperature, Magnesium, Mercury (metal), Performance, Potassium, Specification, Sulfate, Sulfur.

For abstract, see STAR 05 11.
N67-22177 HC$3.00 MF$0.65

CONTINUOUS CHARGE-DISCHARGE CYCLING STUDIES ON HERMETICALLY SEALED NICKEL-CADMIUM CELLS OPERATING AT A 10 PERCENT DEPTH OF DISCHARGE.
Royal Aircraft Establishment, Farnborough (England).
P. G. Garratt, and S. E. Pomroy. Feb 66, 23p
RAE-TR-66045

Descriptors: *Nickel-cadmium battery, *Thermal cycling, Ariel satellite, Battery, Cadmium, Cell, Charge, Cycling, Discharge, Electrochemistry, Energy, Hermetical, Nickel, Radiation, Seal, Silicon, Solar, Storage, Thermal.

For abstract, see STAR 05 11.
N67-22712 HC$3.00 MF$0.65

THE AUTOMATIC CHARGING OF UNSPILLABLE LEAD ACCUMULATORS.
Das Automatische Laden Elektrolytdichter Bleiakkumilatoren
Gt. Brit. Ministry of Aviation, London.
H.-G. Beier, and H. Richt. Dec 66, 10p TIL/T-5697
Transl. Into English From Funkschau Rept. (Germany), V. 1, 1965

Descriptors: *Accumulator, *Charge, Acid, Automatic, Battery, Control, Electronics, Sulfuric, Transistor, Voltage.

For abstract, see STAR 05 11.
N67-22946 HC$3.00 MF$0.65

RADIATION EFFECTS OF SILVER AND ZINC BATTERY ELECTRODES FINAL REPORT, APR. 1965 - OCT. 1966.
Atomics International, Canoga Park, Calif.
G. R. Argue, M. M. Nicholson, and H. L. Recht. 30 Jan 67, 50p NASA-CR-83552, AI-67-7
Contracts NAS7-100, JPL-951109

Descriptors: *Electrode, *Gamma radiation, *Radiation effect, *Silver-zinc battery, Battery, Effect, Evolution, Gamma, Gas, Hydrogen, Oxygen, Radiation, Silver, Zinc.

For abstract, see STAR 05 11.
N67-23280 HC$3.00 MF$0.65

11. MATERIALS

11A. ADHESIVES AND SEALS

WETTING OF HIGH AND LOW ENERGY SURFACES BY LIQUID ADHESIVES AND ITS CORRELATION TO BOND STRENGTH.
Technical rept.,
Picatinny Arsenal Dover N J Feltman Research Labs
Modesto J. Barbarisi. Jan 67, 29p
PA-TR-3456

Descriptors: (*Adhesives, Surface properties), (*Bonded joints, Mechanical properties), Adhesion, Substrates, Interfaces, Polyethylene plastics, Aluminum, Laminated glass, Acrylic resins, Epoxy plastics, Polyamide plastics, Goniometers.

An investigation was conducted to determine the relationship between adhesive wetting and adhesion to certain adherends. The degree of wetting was determined by measuring contact angles with a contact angle goniometer. The effects on contact angles of changing the surface treatment of the polyethylene and aluminum specimens was studied. Next the angles were changed by varying the adherend itself rather than just the surface preparation. Polyethylene, aluminum, and glass laminate were used for the purpose. Finally, the liquid adhesives themselves were changed in order to vary wetting and determine whether or not a speci c relationship exists between wetting and bond strength. Adhesives used were (1) Eastman 910, a cyanoacrylate adhesive; (2) Epon 828/Versamid 140, a polyamide-modified bisphenol A type epoxy; and (3) Kopoxite 159/Versamid 140, a polyamide-modified resorcinol-type epoxy. (Author)
AD-651 093 HC$3.00 MF$0.65

SYNTHESIS OF ALKYL 2-CYANOPROPIONATES AND MEASUREMENT OF THEIR SPREADING COEFFICIENTS ON 1% AQUEOUS CASEIN AND ON WATER.
Technical rept.,
Walter Reed Army Medical Center Washington D C Army Medical Biomechanical Research Lab
Clarence W. R. Wade, and Harold J. Porter. Jan 67, 12p Rept no. TR-6701

Descriptors: (*Tissues (Biology), Adhesives), (*Adhesives, Nitriles), (*Nitriles, Synthesis (Chemistry)), Interfaces, Surface tension, Substrates, Casein, Water, Esters.
Identifiers: Cyanopropionates, Hemostatic agents, Tissue adhesives.

Methyl, n-butyl, and n-heptyl 2-cyanopropionates were synthesized by hydrogenation of the corresponding alkyl 2-cyanoacrylates (alpha-cyanoacrylates). Measurements of their spreading coefficients on 1% aqueous casein and on water show that they are similar to the alykl 2-cyanoacrylates and the alkyl cyanoacetates in their spreading characteristics. (Author)
AD-651 209 HC$3.00 MF$0.65

DETERMINATION OF THE SHRINKAGE OF ADHESIVES DURING CURE.
Mound Lab., Miamisburg, Ohio.
R. A. Fischbein, and J. V. Dichiard. 20 Jan 67, 11p
Contract AT (33-1)-GEN-53

Descriptors: (*Adhesives, Aging (Materials)), (*Shrinkage, Adhesives), Chemical analysis, Containers, Polymerization.

For abstract, see NSA 21 09.
MLM-1361 HC$3.00 MF$0.65

TEMPERATURE LIMITATIONS OF POLYMERIC MATERIALS PART 6 - ELASTOMERS.
Royal Aircraft Establishment, Farnborough (England).
For primary bibliographic entry see Field 11J.
For abstract, see STAR 05 11.
N67-22711 HC$3.00 MF$0.65

11B. CERAMICS, REFRACTORIES, AND GLASSES

DEVELOPMENT AND EVALUATION OF TRANSPARENT MAGNESIUM OXIDE.
Final rept., 15 Oct 65-15 Nov 66,
Avco Corp Lowell Mass Avco Space Systems Div
W. Rhodes, D. Sellers, and T. Vasilos. Feb 67, 60p Rept no. AVSSD-0168-67-RR
AMRA-CR-67-01 (F)
Contract DA-19-066-AMC-291 (x)

Descriptors: (*Magnesium oxides, *Optical materials), Material forming, Hot pressing, Lithium fluorides, Optical properties, Density, Crystal structure, Grain boundaries, Annealing, Wave transmission, Crystal lattices, Diffusion, Phase studies.

The densification parameters for hot pressing MgO to a theoretically dense polycrystalline body was studied. Two experimental approaches were followed; using pure MgO powders, and pressing mixtures of MgO plus small amounts of LiF. In the former case specimens having 60% total transmission (adequate for in line observation) were obtained by very precise control of the fabrication conditions followed by a long term anneal in hydrogen. The MgO - LiF process yielded thin specimens having 85% total transmission in the visible, and 3/8 inch thick specimens possessing a maximum transmission of 70%. A post hot pressing anneal at temperatures greater than 1200C and heating rates less than 28C/hour were required to produce maximum transparency. Evidence obtained by grain growth studies, weight loss experiments and lattice parameter determinations suggest that the densification mechanism for this process was pressure-enhanced diffusion through a solid solution grain boundary layer and a grain boundary phase. At temperatures above the melting point of LiF a pressure-enhanced liquid phase sintering mechanism probably operates. (Author)
AD-650 621 HC$3.00 MF$0.65

THE THERMODYNAMIC PROPERTIES OF THE ALUMINUM SILICATES.
Chicago Univ Ill
For primary bibliographic entry see Field 8G.
AD-650 749 Not available from CFSTI.

THE WATER CONTENT OF HARDENED CONCRETE.
Final rept., Jun 66-Feb 67 on Nuclear Radiation Shielding Studies,
Illinois Univ Urbana
H. Hilsdorf. Feb 67, 99p Rept no. NRSS-4
DASA-1875
Contract DA-49-146-XZ-319

Descriptors: (*Concrete, Moisture), Drying, Hydrogen, Test methods.

Parameters affecting hydrogen content of concrete are discussed. Method is described to compute water content of concrete depending on mix proportions, age, size and exposure conditions of concrete. Sample calculations are given, and values of the water content of concrete members under various climatic conditions are tabulated. (Author)
AD-650 822 HC$3.00 MF$0.65

FABRICATION OF DENSE FINE GRAINED CERAMIC MATERIALS.
Final rept.,
Manlabs Inc Cambridge Mass
D. Kalish, E. V. Clougherty, and J. Ryan. Nov 66, 77p
AMRA-CR-67-04 (F)
Contract DA-19-066-AMC-283 (X)

Descriptors: (*Ceramic materials, *High-pressure research), Particle size, Mechanical properties, Hot pressing, Boron alloys, Carbides, Metallography, Heat-resistant metals + alloys, Microstructure, Titanium, Microscopy, Silicon, Quantitative analysis.

High pressure hot pressing was used to prepare dense, crack free billets of boron carbide, silicon carbide, titanium carbide and titanium nitride. These materials were fabricated from high purity powders without the additions of densification promoters. Fabrications were generally performed in the vicinity of 1800C at 120,000 psi for 10 minutes. Reactive high pressure hot pressing of boron carbide and elemental boron carbide was investigated with different atomic ratios of boron to carbon. Microstructures and mechanical property evaluations were obtained for selected materials prepared by this technique. The results obtained for high pressure hot pressed boron carbide and silicon carbide materials were compared with results of similar evaluation performed on conventionally fabricated samples of boron carbide and silicon carbide. (Author)
AD-650 883 HC$3.00 MF$0.65

MEASUREMENT OF THE DIELECTRIC CONSTANT OF ALUMINUM OXIDE.
Technical rept.,
Texas Univ Austin Defense Research Lab 4410
Robert M. Riley. Aug 62, 60p Rept no. DRL-493
Contract NOrd-16498
Prepared in cooperation with Johns Hopkins Univ., Silver Spring, Md. Applied Physics Lab. CF-2996.

Descriptors: (*Alumina, Dielectric properties), (*Waveguides, Dielectrics), Electric fields, Magnetic fields, Wave transmission, Attenuation, Pro-

pagation, Waveguide couplers, Metal coatings, Silver.

The dielectric constant of aluminum oxide may be measured by finding the change in cutoff frequency of air-filled waveguide by filling the waveguide with aluminum oxide. The theoretical transmission of electric and magnetic waves in a dielectric-filled waveguide is presented. Attenuation of the waves in the waveguide is the basic part of this discussion. Conditions considered cover the range of frequencies from above to below cutoff. The experimental procedure describes the problems encountered in obtaining a good frequency response of the dielectric-filled waveguide. The signal must be coupled into the waveguide so that the attenuation which is measured is that due to the dielectric-filled waveguide only. The waveguide must conform well to the dielectric, or the dielectric constant will appear to be less than it actually is. The exact cutoff frequency of the dielectric-filled waveguide must be obtained to determine the dielectric constant of the dielectric. This is done by comparing the experimental attenuation below cutoff with the theoretical attenuation below cutoff. The cutoff frequency which is determined is checked by knowing what the theoretical attenuation should be exactly at cutoff. The dielectric constant would then be a function of this cutoff frequency and the cutoff of the same air-filled guide. The results obtained will have a rather high degree of accuracy. (Author)
AD-651 005 HC$3.00 MF$0.65

STUDIES OF CERAMIC PROCESSING.
Final rept., 1 Dec 64-15 Dec 65,
Rutgers - the State Univ New Brunswick N J School of Ceramics
E. J. Smoke, C. M. Ringel, and P. L. Fleischner.
15 Dec 65, 81p
Contract NOw-65-0199

Descriptors: (*Ceramic materials, Manufacturing methods), Processing, High-temperature research, Sintering, Crystallization, Alumina, Glass, Additives, Magnesium compounds, Oxides, Silicon compounds, Aluminum compounds, Spinels, Refractory materials, Radomes.

The objective of the program is to improve the structure of ceramics by processing. The over-all temperature range of interest is 1800 to above 3000F. In the high portion of the range, 3000F and above, compositions of pure alumina plus 0 to 2% additions of MgO were studied between 2822 and 3180F, at 1 to 7 hour soaking periods and in atmospheres of hydrogen, helium and vacuum. The analysis of results is reported. Petrographic, x-ray, d.c. conductivity, electron transmission and electron probe methods were used and the results are reported. The low range, 1800 to 2600F, was studied using the devitrification approach to the prereacted materials technique. The area of crystallization of cordierite in the MgO.Al2O3.SiO2 system was evaluated as a single glass system. A two-glass system, in which one glass devitrifies cordierite and the second supplies the bonding system, was studied. Bonding glass compositions were evaluated in the RO.Al2O3.SiO2 system, in which the RO members are alkaline earth oxides. Composites were made at 10, 20 and 30% bonding glass. Processing, structures and properties are reported. (Author)
AD-651 061 HC$3.00 MF$0.65

IMPACT SHOCK ON PIEZOELECTRIC CERAMICS.
Final rept., 1 May 65-30 Apr 67,
Edo Western Corp Salt Lake City Utah 4502
Colin W. Skinner, William T. Kiyota, and Richard C. Lowrie. 1 May 67, 104p Rept no. 11003-9
Contract Nonr-4917 (00)

Descriptors: (*Piezoelectric crystals, Impact shock), Aging (Materials), Life expectancy, Disks, Rings, Electrical properties, Mechanical properties.

Life expectancy tests performed on ceramic rings of compositions EC-55, EC-64, EC-65 and EC-69 have resulted in extensive data regarding the effects of impact shocks on the physical and electrical characteristics of the ceramic rings. The results have indicated that the dissipation and the mechanical Q of the ceramic were the parameters most affected by impact shocks. The dielectric constant was the only electrical characteristic that remained stable under impact shock. Ceramic rings of composition EC-65 were able to withstand higher and more impact shocks than rings of the other three compositions. The results on composition EC-69 indicated that this composition has the lowest mechanical strength with respect to impact shock. The results obtained from life expectancy tests performed on ceramic discs and rings were in agreement regarding the effects of impact shock on their electrical characteristics. The mechanical strength of the ceramic ring configuration was better than that of the ceramic disc configuration. This was true for all four ceramic compositions studied. (Author)
AD-651 100 HC$3.00 MF$0.65

INVESTIGATION OF THE KINETICS OF CRYSTALLIZATION OF MOLTEN BINARY AND TERNARY OXIDE SYSTEMS QUARTERLY STATUS REPORT, DEC. 1, 1966 - FEB. 28, 1967.
United Aircraft Corp., East Hartford, Conn.
J. F. Bacon. 31 Mar 67, 17p NASA-CR-83329, QSR-6
Contract NASW-1301

Descriptors: *Cordierite, *Crystallization, *Glass, Aluminum, Binary, Fiber, Formation, Kinetics, Magnesium, Microscopy, Molten, Nucleation, Oxide, Silicon, System, Ternary, Viscosity.

For abstract, see STAR 05 11.
N67-22211 HC$3.00 MF$0.65

WEAR RATES OF METALS AND OXIDES IN 80 DEG AND 160 DEG F HIGH PURITY WATER.
Atomic Energy of Canada, Ltd., Chalk River (Ontario). Nuclear Lab.
For primary bibliographic entry see Field 18J.
For abstract, see STAR 05 11.
N67-22476 HC$3.00 MF$0.65

PRELIMINARY EXAMINATION OF PROTOTYPE REFRACTORY BIMETALLIC TUBING FROM NUCLEAR METALS, INCORPORATED.
Aerojet-general Corp., Azusa, Calif.
For primary bibliographic entry see Field 13H.
For abstract, see STAR 05 11.
N67-22891 HC$3.00 MF$0.65

ETUDES DE COMPOSES U-Pu-C-Ti (Studies of U-Pu-C-Ti Compounds),
Commissariat a l'Energie Atomique, Fontenay-Aux-Roses (France). Centre d'Etudes Nucleaires.
For primary bibliographic entry see Field 18J.
PB-174 569 HC$3.00 MF$0.65

DEVELOPMENT OF ELECTRICAL CONDUCTING MORTARS,
Bureau of Reclamation, Denver, Colo. Concrete and Structural Branch.
K. B. Hickey, and T. E. Backstrom. 13 Feb 67, 28p Rept. no. G-38

Descriptors: (*Cements, Electrical conductance), (*Towers, Construction materials), (*Transmission lines, Towers), Concrete, Carbon, Reinforced concrete, Bonding, Compressive properties, Resistance (Electrical), Flexural strength, Tensile properties, Corrosion, Leakage (Electrical), Wear resistance, Permeability.

Laboratory studies indicate that lean coke breeze aggregate mortar is highly electrically conductive when either moist or dry. Cement-rich coke breeze mortar possesses satisfactory conductivity, adequate compressive and reinforcement bond strengths, and is suitable for buried footings for grounding, supporting, and anchoring transmission towers. In an effort to produce a conductive mortar for grounding transmission towers in soils corrosive to common grounding materials and to find what mortar materials cause best conductivity, 9 different preliminary mortars were tested for conductivity and compressive strength. The most promising mixes were then further tested for effect of water-cement ratios on electrical resistivity; current drainage and corrosion properties; compressive, flexural, and tensile strengths; reinforcement bar bond strength; compressive and flexural moduli; drying shrinkage; freeze-thaw, sodium sulfate, and abrasion resistances; and water permeability. (Author)
PB-174 595 HC$3.00 MF$0.65

11C. COATINGS, COLORANTS, AND FINISHES

EVALUATION OF VEHICLE CORROSION PREVENTIVES.
Army Weapons Command, Rock Island, Ill. Research and Engineering Div.
For primary bibliographic entry see Field 13H.
AD-476 493 HC$3.00 MF$0.65

IDENTIFICATION OF AEROSOL PROPELLANTS IN PAINT PRODUCTS BY GAS-LIQUID CHROMATOGRAPHY.
Final rept.,
Army Coating and Chemical Lab Aberdeen Proving Ground Md
George G. Esposito. Mar 67, 13p Rept no. CCL-226

Descriptors: (*Paints, Aerosols), (*Propellants, Gas chromatography), Sprays, Flammability, Toxicity, Chromatographic analysis, Halogenated hydrocarbons, Alkanes.

Aerosol packaged paint products have gained widespread acceptance in recent years. Because of safety and toxicity factors, the type of propellant employed is of vital importance. The report describes a rapid, specific procedure for the identification of propellants using gas-liquid chromatography. A chilled can of paint is sprayed into a test tube and the atmosphere above the liquid is sampled. The analysis is conducted on silicone grease and porous polymer columns. (Author)
AD-650 642 HC$3.00 MF$0.65

EVALUATION OF SILICIDE COATINGS ON COLUMBIUM AND TANTALUM AND A MEANS FOR IMPROVING THEIR OXIDATION RESISTANCE,
Lockheed Missiles and Space Co Palo Alto Calif
Lockheed Palo Alto Research Lab
H. W. Lavendel, and A. Grant Elliot. 24 May 66, 6p
Contract AF 33 (615)-1732
Availability: Published in Transactions of the Metallurgical Society of AIME v239 p143-7 Feb 1967.

Descriptors: (*Silicides, Coatings), (*Tantalum, Corrosion inhibition), (*Niobium, Corrosion inhibition), (*Corrosion inhibition, Coatings), Corrosion, Tantalum compounds, Niobium compounds, Oxides, Oxidation.

A qualitative picture was developed to describe the oxidation behavior of TaSi2-coated tantalum and CbSi2-coated columbium. These systems have a significantly lower inherent oxidation resistance than MoSi2-coated molybdenum does. This stems primarily from the fact that Ta2O5 and Cb2O5 are nearly as stable thermodynamically

as SiO2, whereas MoO2 or MoO3 are not. Further, diffusion of silicon in the Ta- and Cb-Si system is considerably slower than in the Mo-Si system. These factors prohibit the mechanism of selective oxidation of silicon which accounts for the oxidation resistance of MoSi2-coated molybdenum. The silicide can be stabilized by adding suitable modifiers which increase the thermodynamic stability of the silicate formed during oxidation. Modifiers, such as aluminum, can be introduced into solid solution in the coating in controlled amounts through proper selection of the source in the pack cementation process of coating formation. Addition of aluminum to TaSi2 coatings on tantalum was effective in moderately increasing the oxidation resistance. (Author)
AD-650 675 Not available from CFSTI.

MATTING OF ALUMINUM AND ITS ALLOYS,
Foreign Technology Div Wright-Patterson AFB Ohio
S. I. Shames. 17 Mar 67, 17p Rept no. FTD-MT-65-395
TT-67-61678
Ematalirovanie Alyuminiya i Ego Splavov, trans. of mono. Anodnaya Zashchita Metallov, Moscow, 1964 p222-32.

Descriptors: (*Aluminum, Anodic coatings), (*Aluminum alloys, Anodic coatings), (*Anodic coatings, Reaction kinetics), USSR, Films, Corrosion inhibition, Coatings, Oxidation, Dielectric properties, Wear resistance, Hardness, Resistance (Electrical).

The report covers a study of film formation kinetics and the properties of anodic oxide films produced in an o lic acid electrolyte with the titanium salt TiO (KC2O4)2. 2H2O on aluminum AD-1 and Al alloys AMtsM and D16-T (unclad). Samples were wiped with benzine, chemically degreased (bath compositions given, 3 min., 60-70C for unpolished and 3-5 min., 70-80C for polished samples), hot and cold water rinsed, bleached (1-2 min., 40-50% HNO3, 18-20C), then anodized (bath composition given). The optimal conditions were 55C and 40 min. at 2 a/sq dm or 30 min. at 3 a/sq dm. Corrosion resistance was high and increased with process duration. Increasing the pH to a value of 3 did not affect film quality. Corrosion resistance, abrasive and friction wear, hardness, volume resistivity and dielectric strength characteristics of these films were better than for standard oxide films produced in sulfate or oxalate baths. (Author)
AD-651 088 HC$3.00 MF$0.65

TEMPERATURE LIMITATIONS OF POLYMERIC MATERIALS, PART 5 - FILMS.
Royal Aircraft Establishment, Farnborough (England).
G. Wood. Apr 64, 12p RAE-TN-CPM-51

Descriptors: *Film, *Paint, *Polymer, *Protective coating, *Thermal property, Acrylic, Alkyd, Chloride, Epoxy, Methyl, Neoprene, Nitrocellulose, Nylon, Polyethylene, Polyurethane, Primer, Protection, Radome, Silicone, Vinyl.

For abstract, see STAR 05 11.
N67-22717 HC$3.00 MF$0.65

MATERIALS EVALUATION OF TRANSITION JOINTS FOR TRANSFORMER REACTOR ASSEMBLY.
Aerojet-general Corp., Azusa, Calif.
For primary bibliographic entry see Field 18N.
For abstract, see STAR 05 11.
N67-22894 HC$3.00 MF$0.65

11D. COMPOSITE MATERIALS

BEHAVIOR OF COMPRESSIVELY LOADED REINFORCING WIRES.
Stanford Research Inst Menlo Park Calif 0511
For primary bibliographic entry see Field 20K.
AD-650 617 HC$3.00 MF$0.65

MECHANICS OF COMPOSITE MATERIALS. PART II. THEORETICAL ASPECTS.
Technical rept.,
Air Force Materials Lab Wright-Patterson AFB Ohio
Stephen W. Tsai. Nov 66, 70p Rept no. AFML-TR-66-149-Pt-2
See also AD-645 073.

Descriptors: (*Composite materials, Mechanics), Theory, Reinforcing materials, Fibers, Tensor analysis, Transformations (Mathematics), Elasticity, Stresses, Strain (Mechanics), Laminates.

The report covers some of the principles of the mechanics relevant to the description of composite materials. The contents of these notes may provide useful information for the understanding of current publications and reports related to composite materials. Emphasis is placed on the use of indicial notation and operations. The rules governing the use of the contracted notation are also outlined. The generalized Hooke's law and its transformation properties, material symmetries, and engineering constants are also discussed. The plane strain and plane stress problems are discussed in detail. Finally, the elastic moduli of laminated anisotropic materials, and the strength of both unidirectional and laminated composites are covered. (Author)
AD-650 829 HC$3.00 MF$0.65

SMALL GAS TURBINE ENGINE COMPONENT TECHNOLOGY, HIGH-TEMPERATURE TURBINE MATERIALS RESEARCH.
Boeing Co Seattle Wash Turbine Div
For primary bibliographic entry see Field 21E.
AD-651 103 HC$3.00 MF$0.65

INVESTIGATION OF BONDING IN OXIDE-FIBER (WHISKER) REINFORCED METALS.
Quarterly rept. no. 3, 18 Oct 66-18 Jan 67,
General Electric Co Philadelphia Pa Missile and Space Div
W. Edwin Sauer, Willard H. Sutton, and Earl Feingold. 31 Jan 67, 28p
AMRA-CR-66-01/3
Contract DA-19-066-AMC-330 (X)

Descriptors: (*Composite materials, Bonding), (*Ceramic fibers, Composite materials), (*Nickel, Reinforcing materials), (*Sapphires, Ceramic fibers), Oxides, Alumina, Metals, Whiskers (Crystals), Mechanical properties, Additives, Solid solutions, Interfaces, Drop testing, Crystal structure, Nickel alloys, Titanium alloys, Chromium alloys, Zirconium alloys.
Identifiers: Metal-matrix composites.

Factors affecting the wetting and bonding of nickel to sapphire (alpha-Al2O3) were investigated in a continuing study. The effects on the wetting behavior .001 to 1.0 atomic percent of active metal additives to the nickel were studied in detail. A series of 35 sessile drop experiments were performed and the results were analyzed to determine some of the parameters which affect the wetting. The crystallographic orientation of the sapphire substrate and a 'locking-in' of the contact angle had a profound influence on the measured contact angle, and this influence increased with increasing time at melting. (Author)
AD-651 190 HC$3.00 MF$0.65

TEMPERATURE LIMITATIONS OF POLYMERIC MATERIALS. PART 2 - STRUCTURAL REINFORCED PLASTICS.
Royal Aircraft Establishment, Farnborough (England).
For primary bibliographic entry see Field 11I.
For abstract, see STAR 05 11.
N67-22702 HC$3.00 MF$0.65

COMPRESSIVE BEHAVIOR OF PLATES FABRICATED FROM GLASS FILAMENTS AND EPOXY RESIN.
National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
For primary bibliographic entry see Field 20K.
For abstract, see STAR 05 11.
N67-23297 HC$3.00 MF$0.65

11E. FIBERS AND TEXTILES

PLASTIC FLOW RATES IN NYLON INTERPRETED IN TERMS OF DISLOCATION MOTION,
Illinois Univ Urbana Dept of Mining Metallurgy and Petroleum Engineering
For primary bibliographic entry see Field 11I.
AD-650 578 HC$3.00 MF$0.65

DEEP-OCEAN BIODETERIORATION OF MATERIALS. PART VI. ONE YEAR AT 2,370 FEET.
Naval Civil Engineering Lab Port Hueneme Calif
For primary bibliographic entry see Field 13J.
AD-651 124 HC$3.00 MF$0.65

COMPARISON OF OLIVE GREEN AND CAMOUFLAGE PRINTED NOMEX NYLON COVERALL CLOTH.
Summary rept.,
Naval Air Engineering Center Philadelphia Pa Aeronautical Materials Lab
Margaret B. Hays. 30 Mar 67, 4p
NAEC-AML-2597

Descriptors: (*Textiles, Shrinkage), (*Nylon, Textiles), Tests, Laundering, Printing, Clothing, Camouflage, Flight clothing.

This reports a comparative shrinkage test of olive green and camouflage printed Nomex herringbone twill. (Author)
AD-651 214 HC$3.00 MF$0.65

11F. METALLURGY AND METALLOGRAPHY

STUDIES ON THE HIGH TEMPERATURE OXIDATION OF MOLYBDENUM, TUNGSTEN, NIOBIUM, TANTALUM, TITANIUM, AND ZIRCONIUM.
Final rept.,
Westinghouse Research Labs Pittsburgh Pa
E. A. Gulbransen, K. F. Andrew, and F. A. Brassart. 18 Apr 67, 69p
AROD-4067:3-MC
Contract DA-31-124-ARO (D)-196

Descriptors: (*Corrosion resistance, *Heat-resistant metals + alloys), (*Gas flow, Oxidation), Reaction kinetics, Molybdenum, Tungsten, Niobium, Tantalum, Titanium, Zirconium, Electron diffraction analysis, Gases, Solids, Vacuum apparatus.

The purpose of these studies was twofold: (1) to extend and develop vacuum microbalance and electron diffraction methods for studying fast oxidation reactions of high temperature metals and solids under carefully controlled conditions of temperature, pressure, and gas flow; and (2) to determine the kinetics and mechanisms of oxidation of a number of high temperature metals and solids.
AD-650 638 HC$3.00 MF$0.65

EVALUATION OF SILICIDE COATINGS ON COLUMBIUM AND TANTALUM AND A MEANS

FOR IMPROVING THEIR OXIDATION RESISTANCE,
Lockheed Missiles and Space Co Palo Alto Calif
Lockheed Palo Alto Research Lab
For primary bibliographic entry see Field 11C.
AD-650 675 Not available from CFSTI.

NITROGEN TETROXIDE-STAINLESS STEEL CRYOPANEL CORROSION AND COATING DEGRADATION IN SPACE CHAMBER PROPULSION TESTING,
Rept. for Oct 65-30 Jun 66,
Arnold Engineering Development Center Arnold Air Force Station Tenn
P. G. Waldrep. Apr 67, 34p Rept no. AEDC-TR-66-226
Contract AF 40 (600)-1200
Prepared in cooperation with ARO, Inc., Arnold Air Force Station, Tullahoma, Tenn.

Descriptors: (*Stainless steel, *Corrosion), Cryogenics, Nitrogen compounds, Oxides, Space simulation chambers, Panels (Structural), Plastic coatings, Welds, Vacuum, Degradation, Exhaust gases.

Corrosion of cryopanel metals in space simulation chambers caused by contamination by fuels, oxidizers, or exhaust gases arising from propulsion systems testing may be a serious problem. Since data taken under operational conditions is needed, a preliminary study using nitrogen tetroxide and 300-series stainless steel was initiated. The temperature was cycled between ambient conditions and 77K, and the pressure between 4 and 0.00001 torr of oxidizer. A black epoxy film covered some of the samples. Welded stainless steel 304 sustained general corrosion with some pitting, and intergranular corrosion was detected in heat-sensitized weld areas. Epoxy coated stainless steel 304 samples demonstrated no apparent damage in one series of short tests, but pit formation in the coating, pitting beneath the coating, and intergranular corrosion in weld areas was detected in a longer test. Heat-treated and polished stainless steel 304-L pitted to an indeterminate depth. An epoxy coated sample of similar material suffered microscopic cracking and blistering of the coating and surface pitting beneath. (Author)
AD-650 690 HC$3.00 MF$0.65

de HAAS-van ALPHEN EFFECT IN FERROMAGNETIC NICKEL,
Chicago Univ Ill
For primary bibliographic entry see Field 20L.
AD-650 715 Not available from CFSTI.

THE PLASTIC DEFORMATION OF MAGNESIUM,
Doctoral thesis,
Michigan Univ Ann Arbor Dept of Chemical and Metallurgical Engineering
E. W. Kelley. Feb 67, 102p Rept no. 07164-1-T
AROD-5407.3-MC
Contract DA-31-124-ARO (D)-321

Descriptors: (*Magnesium, Deformation), (*Magnesium alloys, Deformation), Theses, Single crystals, Crystals, Thorium alloys, Lithium alloys, Crystal structure.

Deformation studies were conducted at room temperature on single crystals and textured polycrystals of magnesium and magnesium alloys with thorium and with lithium. Single crystals oriented to suppress shear on the easily activated basal slip systems were deformed by plane-strain compression. Compression along the c-axis was accommodated by <10-11> banding. Compression perpendicular to the unconstrained c-axis activated <10-12> twinning, and, after virtually complete twinning, deformation continued by <10-11> banding in the twinned material. Compression perpendicular to the constrained c-axis was accommodated by the simultaneous operation of <10-12> twinning against the constrain and <10-11> banding. Although this orientation was favorable for <10-10> <12-10> prism and <10-11> <12-10> pyramidal slip, these modes were not observed in pure magnesium or in Mg-.5%Th. However, <10-10> <12-10> prism slip was active in crystals of Mg-4%Li during compression perpendicular to the constrained c-axis. Fracture in all materials occurred parallel to <11-24> or <10-11> depending on the orientation and composition of the specimen. (Author)
AD-650 746 HC$3.00 MF$0.65

ELECTRON-MICROSCOPE INVESTIGATION OF THE SYSTEM OF ALLOYS Al-Zn-Mg,
Institute of Modern Languages Inc Washington D C
A. B. Spiridonov, T. A. Vlasova, and V. N. Iordanakii. Apr 67, 13p
TT-67-61618, AERDL-T-1901-67
Contract DA-44-009-AMC-1563 (T)
Elktronnomikroskopi-cheskoe Issledovanie Sistemy Al-Zn-Mg, trans. of Metallovedenie i Termicheskaya Obrabotka Metallov (USSR), n8 p6-11 1966.

Descriptors: (*Aluminum alloys, Melting), (*Zinc alloys, Rolling (Metallurgy)), (*Magnesium alloys, Aging (Materials)), Metal plates, Thickness, Mechanical working, Chemical analysis, Heat treatment, Electron microscopes, Electron diffraction analysis.

Two methods can be recommended for decreasing the tendency of an alloy to corrode under stress. (1) Decrease of the concentration of vacancies before aging by reducing the rate of cooling during hardening or by increasing the aging temperature with obligatory introduction into the alloy of the proper amount of elements (Cr, Mn, Pe, Si, Ti, Zr, etc.) which yield insoluble intermetallides during heating for hardening. However, this method leads also to a lowering of the strength characteristics. Regulation of the concentration of vacancies by changing the hardening temperature is not discussed here, since the choice of temperature is influenced by a number of technological factors. (2) Increase of the concentration of vacancies, and, consequently, provision for a more dispersed and uniform decomposition by means of the introduction of elements which increase the 'solubility' of vacancies (Zr, Ti, Sc, Cu, Ag). Evidently a combination of the two methods is expedient for obtaining the optimal complex of properties of the considered alloy types. Besides, one should take into consideration the indirect positive effect of admixtures of the recrystallization temperature and the increase of the length of the grain boundaries connected therewith.
AD-650 909 HC$3.00 MF$0.65

HIGH-TEMPERATURE VACUUM FATIGUE TESTING OF TYPE 316 STAINLESS STEEL AND INCONEL X WITH A RESONANCE-TYPE MACHINE,
Naval Research Lab Washington D C
For primary bibliographic entry see Field 20K.
AD-650 934 HC$3.00 MF$0.65

EVALUATION OF ALUMINUM ALLOY 7001-T75.
Technical rept.
Aerospace Industries Association of America Inc Washington D C
Dec 66, 343p Rept no. TR-101
Availability: Hard copy available from National Standards Assoc., Inc., 1321 Fourteenth St., N. W., Washington, D. C., $7.50.

Descriptors: (*Aluminum alloys, *Mechanical properties), (*Chemical analysis, Aluminum alloys), Tensile properties, Hardness, Extrusion, Forging, Fatigue (Mechanics), Shear stresses, Microstructure, Corrosion, Sheets, Tables, Diagrams, Graphics, Tests, Data.
Identifiers: Aluminum alloy 7001-T75.

The purpose of the project was development of design criteria for a material with the strength of 7075-T6 and virtual immunity to stress and exfoliation type corrosion. This evaluation covers the following: Sheet - Aluminum Alloy 7001-T75; Plate - Aluminum Alloy 7001-T75; Extrusion - Aluminum Alloy 7001-T75; Hand Forging - Aluminum Alloy 7001-T75; Die Forging - Aluminum Alloy 7001-T75; Axial Fatigue - Aluminum Alloy 7001-T75 Hand and Die Forgings. (Author)
AD-650 948 MF$0.65

ON THE DILUTE SOLUTIONS OF SILVER, GOLD AND PLATINUM IN LIQUID LEAD.
Technical rept.,
Massachusetts Inst of Tech Cambridge Dept of Metallurgy
A. K. Jena, and M. B. Bever. 6 Apr 67, 9p Rept no. TR-3
Contract Nonr-3963 (19)
Availability: Published in Transactions of the Metallurgical Society of AIME 9p n.d.

Descriptors: (*Liquid metals, *Solutions), (*Heat of solution, *Metals), Silver, Calorimetry, Enthalpy, Gold, Platinum, Molecular energy levels, Lead, Thermodynamics.

Heat effects on addition of silver, gold and platinum to liquid lead at 623 K have been measured in a metal solution calorimeter. The relative partial gram-atomic enthalpies, or heats of solution, at infinite dilution and the concentration dependence of the partial gram-atomic enthalpies have been determined. These results are not explained by current solution theories. If the regular solution theory is modified by assigning a non-zero value to the relative bond energy between solute atoms in solution and applied to the experimental results, reasonable values of 8, 2 and 14 pct for the change in bond energy on solution in lead are obtained for silver, gold and platinum, respectively. (Author)
AD-650 961 Not available from CFSTI.

TEMPERED MARTENSITE EMBRITTLEMENT AND FRACTURE TOUGHNESS IN 4340 STEEL.
Technical rept.,
Army Materials Research Agency Watertown Mass
Eric B. Kula, and Albert A. Anctil. Jan 67, 29p
Rept no. AMRA-TR-67-03

Descriptors: (*Steel, *Embrittlement), Martensite, Fracture (Mechanics), Toughness, Tensile properties.
Identifiers: Steel 4340.

Tempered martensite embrittlement (500 F embrittlement) was studied in 4340 steel by means of Charpy impact, tension, and fracture toughness tests carried out over a range of test temperatures. Embrittlement was shown in the impact tests by a minimum in room temperature impact properties for tempering temperatures ranging from 500 to 650 F, the same range for which the transition temperature is a maximum. No evidence of embrittlement was found in tension or room temperature fracture toughness tests. Embrittlement was noted, however, in fracture toughness tests carried out at -50 and -100 F, which indicates that low temperature testing will be necessary for proper materials evaluation. The plane strain fracture toughness (K sub Ic) of various heats of 4340 steel has been correlated with the weight percent sulfur and phosphorus in the steel. A mechanism for tempered martensite embrittlement is proposed. Certain impurity elements, such as phosphorus, which are more soluble in ferrite than in cementite, will segregate in the ferrite adjacent to the cementite shortly after the cementite precipitation. This transient enrichment of ferrite by impurity elements will be embrittling when the cementite is in a platelet or filmy form, and particularly so in the region of the prior austenite grain boundaries, where the

impurity content may be higher than average. (Author)
AD-651 066 HC$3.00 MF$0.65

MATTING OF ALUMINUM AND ITS ALLOYS,
Foreign Technology Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 11C.
AD-651 088 HC$3.00 MF$0.65

SMALL GAS TURBINE ENGINE COMPONENT TECHNOLOGY, HIGH-TEMPERATURE TURBINE MATERIALS RESEARCH.
Boeing Co Seattle Wash Turbine Div
For primary bibliographic entry see Field 21E.
AD-651 103 HC$3.00 MF$0.65

DEEP-OCEAN BIODETERIORATION OF MATERIALS. PART VI. ONE YEAR AT 2,370 FEET.
Naval Civil Engineering Lab Port Hueneme Calif
For primary bibliographic entry see Field 13J.
AD-651 124 HC$3.00 MF$0.65

CORROSION RESISTANCE AND DURABILITY OF FASTENERS IN AIRCRAFT STRUCTURES.
Naval Air Engineering Center Philadelphia Pa Aeronautical Materials Lab
For primary bibliographic entry see Field 13E.
AD-651 189 HC$3.00 MF$0.65

PLASTIC DEFORMATION IN ORDERED SOLID SOLUTIONS AND ITS EFFECTS ON PHYSICAL PROPERTIES.
Final rept.,
Comision Nacional de Energia Atomica San Carlos de Bariloche (Argentina) Centro Atomico Bariloche
A. E. Vidoz. 1966, 16p
Grant DA-ARO-49-092-65-G83

Descriptors: (*Solid solutions, Deformation), (*Crystals, Deformation), Nickel alloys, Iron alloys, Copper alloys, Gold alloys, Intermetallic compounds, Single crystals, Heat of activation, Creep, Hall effect, Stresses, Physical properties, Hardening.

Deformation tests were made of Ni3 Fe and Cu3 Au. Disordered state single crystals show 3 stages deformation as in pure metals. But 1st stage due propagation Luders bands. Stage II linear hardening with slop G/400, G= shear modulus. In ordered state linear work hardening depends on domain size, test temp., crystallographic orientation. Tensile axis rotation agrees with calc. assuming single glide. Deformation tensile axis overshoots symmetry line (100) (111), shows strong latent hardening secondary systems. Strain ageing depends critically stage of deformation. Secondary slip important in controlling plastic deformation ordered Solid Solutions. Formation antiphase boundary tubes explains exptl. results if original model modified with geometrical relationship between primary and conjugate applied stresses and consideration of latent hardening effect. An investigation was made of the dependence alpha on domain size Cu3 Au. Alpha reaches saturation value after no further increase in degree of order. Longer annealing modifies domain size but alpha constant. Activation energy 25 Kcal /mole. continues. An investigation was made of activation enthalpies and volumes for creep in Ni3 Fe in temp. range 40 - 150C, ordered and disord cond. Above 150C, ageing effect interferes, deformation becomes discontinuous. Kinetics of ageing faster in disordered state. Self diffusion of Ni creep controlling at high temp., max. at 72/25 Ni/Fe comp. (Author)
AD-651 192 HC$3.00 MF$0.65

STUDY OF SOLUTION DEOXYGENATION AND SPECIMEN PRETREATMENT TECHNIQUES FOR USE IN THE HYDROGEN PERMEATION APPARATUS,
Naval Air Engineering Center Philadelphia Pa Aeronautical Materials Lab
Joan G. Gionnoscoli. 14 Mar 67, 10p Rept no. NAEC-AML-2592

Descriptors: (*Paint removers, Hydrogen embrittlement), (*Hydrogen embrittlement, Test methods), (*Membranes, Permeability), Electrochemistry, Electrolytes, Solutions, Metal films, Palladium, Oxygen, Removal, Surfaces, Preparation, Helium, Iron, Steel.

An electrochemical technique that was previously developed by Devanathan and Stachurski (Proc. Royal Sec. vA270 p90 1962) for measuring the permeation rate of hydrogen through a palladium coated membrane of iron or steel shows promise as a method for determining the hydrogen embrittling characteristics of paint strippers. A program was therefore initiated to determine the reproducibility of the method, the first phases of which are reported. It was found that oxygen could be rapidly and effectively removed from the alkaline solution by treatment with helium and sodium sulfite. Pretreatment of the test specimen surfaces proved to be of value in increasing permeation currents and, in additon, improved the reproducibility of the method.
AD-651 211 HC$3.00 MF$0.65

VANADIUM ALLOY SCREENING STUDIES AND FABRICATION OF V-15 ST. PERCENT TI-7.5 WT. PERCENT CR TUBING FOR NUCLEAR FUEL CLADDING,
Argonne National Lab., Ill.
W. C. Kramer, W. R. Burt, Jr. and F. J. Karasek.
Aug 66, 60p
Contract W-31-109-eng-38

Descriptors: (*Reactor fuel cladding, Vanadium alloys), (*Vanadium alloys, Reactor materials), Pipes, Creep, Welding, Production, Annealing, Tensile properties.

For abstract, see NSA 21 09.
ANL-7206 HC$3.00 MF$0.65

URANIUM PRICE SCHEDULES BY UCOST CODE COMPUTATION,
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
For primary bibliographic entry see Field 5A.
For abstract, see NSA 21 09.
BNWL-312 HC$3.00 MF$0.65

INVESTIGATION OF ADHESION AND COHESION OF METALS IN ULTRAHIGH VACUUM.
Quarterly progress rept. no. 1, 15 Jun 61-30 Jun 62,
National Research Corp., Cambridge, Mass.
John L. Ham. 15 Sep 61, 13p
Contract NAsr-48

Descriptors: (*Adhesion, *Metals), (*Vacuum, Metals), Measurement, Vacuum apparatus, Transducers, Copper alloys, Beryllium alloys, Thermocouples, Calibration.

Apparatus for the measurement of cohesion has been modified and calibrated in preparation for initial tests on O.F.H.C. copper by the fracture-rejoin method proposed. (Author)
N62-10571 HC$3.00 MF$0.65

DEVELOPMENT AND EVALUATION OF MAGNETIC AND ELECTRICAL MATERIALS CAPABLE OF OPERATING IN THE 800 DEG TO 1600 DEG F TEMPERATURE RANGE QUARTERLY REPORT, 1 DEC. 1965 - 28 FEB. 1966.
Westinghouse Electric Corp., Lima, Ohio. Aerospace Electrical Div.
For primary bibliographic entry see Field 22B.
For abstract, see STAR 05 11.
N67-22066 HC$3.00 MF$0.65

THE PILOT PRODUCTION AND EVALUATION OF CHROMIUM ALLOY SHEET AND PLATE FINAL REPORT.
General Electric Co., Cleveland, Ohio. Lamp Metals and Components Dept.
L. J. Goetz, J. R. Hughes, and W. F. Moore. 15 Mar 67, 98p NASA-CR-72184
Contracts NAS3-7901, NAS3-7919

Descriptors: *Chromium alloy, *Extrusion, *Induction heating, *Metal plate, *Rolling, *Sheet metal, Alloy, Chromium, Gas, Heating, Hot extrusion, Hot forming, Induction, Melting, Metal, Plate, Rare, Sheet.

For abstract, see STAR 05 11.
N67-22175 HC$3.00 MF$0.65

THERMODYNAMIC PROPERTIES OF INTERSTITIAL ELEMENTS IN THE REFRACTORY METALS SEMIANNUAL REPORT, 1 JUN. - 1 DEC. 1966.
State Univ. of New York, Stony Brook. Coll. of Engineering.
L. Seigle, and R. Singh. 1 Dec 66, 24p NASA-CR-83391, SAR-1
Contract NGR-33-015-035

Descriptors: *Interstitial atom, *Refractory metal, *Thermodynamic property, Atom, Carbide, Carbon, Element, Entropy, Equilibrium, Interstitial, Metal, Molybdenum, Niobium, Phase, Property, Refractory, Tantalum, Thermodynamic, Tungsten.

For abstract, see STAR 05 11.
N67-22439 HC$3.00 MF$0.65

WEAR RATES OF METALS AND OXIDES IN 80 DEG AND 160 DEG F HIGH PURITY WATER.
Atomic Energy of Canada, Ltd., Chalk River (Ontario). Nuclear Lab.
For primary bibliographic entry see Field 18J.
For abstract, see STAR 05 11.
N67-22476 HC$3.00 MF$0.65

INFLUENCE OF CHEMICAL CONTOURING ON THE FATIGUE AND SUSTAINED LOAD PROPERTIES OF HIGH TENSILE STEEL SHEET.
Saunders-roe, Ltd. (Gt. Brit.)
May 64, 29p ARC-CP-812, ARC-26155

Descriptors: *Bending fatigue, *Contour, *High strength steel, *Load factor, Acid, Alloy, Bending, Chemical, Etching, Factor, Fatigue, High, Load, Property, Sheet, Steel, Tensile, Test.

For abstract, see STAR 05 11.
N67-22798 HC$3.00 MF$0.65

RESULTS OF SHORT-TIME TENSILE TESTS OF 9 CR-1 MO ALLOY BAR.
Aerojet-general Corp., Azusa, Calif.
C. J. Romero. 27 Jan 64, 19p NASA-CR-72203, TM-390-64-4-184, REV.
Revised

Descriptors: *Chromium alloy, *Molybdenum alloy, *Steel *Stress-strain distribution, *Tensile strength, Alloy, Bar, Chromium, Curve, Data, Distribution, High temperature, History, Metallurgy, Molybdenum, Specimen, Strength, Stress-strain, Tensile.

For abstract, see STAR 05 11.
N67-22848 HC$3.00 MF$0.65

EVALUATION OF COLDWELDED BUTT JOINT TRANSITION PIECE.
Aerojet-general Corp., Azusa, Calif.

Group 11F — Metallurgy and metallography

R. A. Mendelson. 21 Jan 64, 13p NASA-CR-72204, TM-390-64-4-183

Descriptors: *Aluminum, *Copper, *Metal joint, *Tension testing machine, *Welded joint, Bending, Butt, Cold, Evaluation, Joint, Metal, Metallurgy, Reverse, Tension, Testing, Welding.

For abstract, see STAR 05 11.
N67-22851 HC$3.00 MF$0.65

ALUMINUM-TO-COPPER COLDWELDED JOINTS FOR SNAP-8 ELECTRICAL TERMINAL APPLICATIONS.
Aerojet-general Corp., Azusa, Calif.
H. E. Bleil. 16 Aug 65, 7p NASA-CR-72194, TM-4923-65-4-309

Descriptors: *Aluminum, *Copper, *Electric terminal, *Metallography, *Snap- 8, *Welded joint, Cold, Electric, Examination, Exposure, Joint, Mechanical, Terminal, Testing, Thermal, Welding.

For abstract, see STAR 05 11.
N67-22856 HC$3.00 MF$0.65

INVESTIGATION OF THE ADHESION OF METALS IN ULTRA-HIGH VACUUM.
National Research Corp., Cambridge, Mass. Norton Exploratory Research Div.
M. J. Hordon, and J. R. Roehring. Dec 66, 52p NASA-CR-66279
Contract NAS1-2691

Descriptors: *Adhesion, *Copper, *Friction, *Titanium, *Tungsten, *Ultrahigh vacuum, Abrasion, Annealing, Bombardment, Force, Gas, Ion, Shear, Torque, Xenon.

For abstract, see STAR 05 11.
N67-22884 HC$3.00 MF$0.65

EVALUATION OF KOLDWELDED BUTT JOINT TRANSITION PIECE.
Aerojet-general Corp., Azusa, Calif.
R. A. Mendelson. 17 Apr 64, 11p NASA-CR-72198, TM-390-64-4-220

Descriptors: *Aluminum, *Joint, *Metal-metal bonding, *Nickel, Bonding, Failure, Mechanical, Metal, Metallurgy, Pressure, Tension, Torsion, Welding.

For abstract, see STAR 05 11.
N67-22889 HC$3.00 MF$0.65

CORROSION OF STAINLESS STEELS IN HIGH TEMPERATURE WATER AND STEAM.
Societe D Etudes, de Recherches Et D Applications pour L Industrie, Brussels (Belgium).
J.-PH.Berge, P. De Dorlodot, J. Hennaut, W. R. Ruston, and M. Warzee. Dec 66, 14p EUR-2857.E, EURAEC-1665
Contract EURATOM-089-62-7 RDB
Presented At the 3rd Intern. Congr. on Metallic Corrosion Moscow, 16-25 May 1966

Descriptors: *High temperature fluid, *Metal corrosion, *Stainless steel, *Steam, *Water, Corrosion, Crystal, Epitaxy, Fluid, Growth, High temperature, Magnetite, Mass, Material, Metal, Oxidation, Reactor, Solubility, Stainless, Steel, Structural, Superheating, Transfer.

For abstract, see STAR 05 11.
N67-22906 HC$3.00 MF$0.65

HIGH TEMPERATURE TENSILE PROPERTIES OF UNIRRADIATED AND NEUTRON IRRADIATED 20 CR- 35 NI AUSTENITIC STEEL.
Aktiebolaget Atomenergi, Stockholm (Sweden).
R. B. Roy, and B. Solly. Dec 66, 26p AE-260

Descriptors: *Austenitic steel, *Neutron bombardment, *Tensile strength, Alloy, Austenite, Bombardment, Boundary, Chromium, Effect, Fracture, Grain, High temperature, Irradiation, Mechanical, Neutron, Nickel, Radiation, Steel, Strength, Tensile.

For abstract, see STAR 05 11.
N67-22957 HC$3.00 MF$0.65

INFLUENCE OF THE CYCLE RATIO ON THE FATIGUE STRENGTH OF DRILLED FLAT BARS OF ST 37 STEEL MATERIAL. PART B - MULTI-STEP AND PROGRAM TESTS.
Laboratorium Fur Betriebsfestigkeit, Darmstadt (West Germany).
For primary bibliographic entry see Field 20K.
For abstract, see STAR 05 11.
N67-22961 HC$3.00 MF$0.65

FATIGUE STRENGTH OF NOTCHED AND UNNOTCHED SPECIMENS OF AL MG SI 1 (6061 T-6) AND AL MG 5/5056/.
Schwingfestigkeit Von Al Mg Si 1 Und Al Mg 5 Im Gekerbten Und Ungekerbten Zustand
Laboratorium Fur Betriebsfestigkeit, Darmstadt (West Germany).
W. Schuetz. 1966, 123p FB-57, ICAF-345
in German, English Summary

Descriptors: *Aluminum compound, *Fatigue life, *Magnesium compound, Aluminum, Axis, Compound, Design, Evaluation, Fatigue, Life, Load, Magnesium, Metal, Notch, Silicon, Statistics, Strength, Stress, Structural, Test.

For abstract, see STAR 05 11.
N67-23015 HC$3.00 MF$0.65

STUDIES OF STEEL CORROSION IN HIGH TEMPERATURE WATER AND STEAM.
Societe D Etudes, de Recherches Et D Applications pour L Industrie, Brussels (Belgium).
30 Oct 66, 89p EUR-3304, EURAEC-1744
Contract EURATOM-087-66-TEEB RD
Transl. Into English From French

Descriptors: *High temperature environment, *Metal corrosion, *Stainless steel, Corrosion, Electrolyte, Environment, Grain, High temperature, Metal, Milling, Oxidation, Oxygen, Recrystallization, Stainless, Steam, Steel, Surface, Treatment, Water.

For abstract, see STAR 05 11.
N67-23186 HC$3.00 MF$0.65

AN EMPIRICAL EQUATION RELATING FATIGUE LIMIT AND MEAN STRESS.
National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
I. E. Figge. Apr 67, 30p NASA-TN-D-3883
Contract 126-14-03-08-23

Descriptors: *Axial load, *Metal fatigue, *Stress, Alloy, Aluminum, Axial, Cladding, Equation, Fatigue, Load, Metal, Stainless, Steel, Strength, Superalloy, Tensile, Titanium.

For abstract, see STAR 05 11.
N67-23286 HC$3.00 MF$0.65

GENERATION OF LONG TIME CREEP DATA ON REFRACTORY ALLOYS AT ELEVATED TEMPERATURES QUARTERLY REPORT, 26 OCT. - 26 DEC. 1966.
TRW Equipment Labs., Cleveland, Ohio. Materials Research and Development Dept.
J. C. Sawyer, and E. A. Steigerwald. 17 Jan 67, 135p NASA-CR-72185, QR-14
Contract NAS3-2545

Descriptors: *Creep analysis, *Molybdenum alloy, *Refractory metal, *Tantalum alloy, *Tungsten alloy, Alloy, Analysis, Composition, Creep, Data, Design, Heat, High temperature, Metal, Molybdenum, Power, Refractory, Space, System, Tantalum, Test, Time, Treatment, Tungsten, Vacuum.

For abstract, see STAR 05 11.
N67-23323 HC$3.00 MF$0.65

REPORT OF NRL PROGRESS.
Naval Research Lab., Washington, D. C.
For primary bibliographic entry see Field 14B.
PB-174 485 HC$3.00 MF$0.65

11G. MISCELLANEOUS MATERIALS

AN INVESTIGATION OF BASIC MECHANISMS OF TRANSIENT HIGH ENERGY RADIATION EFFECTS IN INSULATORS AND SEMICONDUCTORS.
Hughes Aircraft Co., Fullerton, Calif. Ground Systems Group.
For primary bibliographic entry see Field 9A.
AD-462 730 HC$3.00

DEVELOPMENT OF A MICROCRACKING TECHNIQUE FOR MEASURING IN SITU STRESS AND STRAIN. REPORT 1. LABORATORY TESTS.
Army Engineer Waterways Experiment Station Vicksburg Miss
For primary bibliographic entry see Field 20K.
AD-650 563 MF$0.65

DEVELOPMENT OF A MICROCRACKING TECHNIQUE FOR MEASURING IN SITU STRESS AND STRAIN. REPORT 2. FIELD TESTS.
Army Engineer Waterways Experiment Station Vicksburg Miss
For primary bibliographic entry see Field 20K.
AD-650 564 MF$0.65

11H. OILS, LUBRICANTS, AND HYDRAULIC FLUIDS

FLUID CONTAMINATION IN TRAIN AND EVALUATION POWER DRIVES.
Final rept., Dec 61-Jun 65,
Franklin Inst Research Labs Philadelphia Pa
R. H. Hollinger, J. Stone, J. N. Donis, T. I. Haigh, and G. F. Lare. Sep 65, 59p Rept no. F-B2350
Contracts NOw-62-0145, NOw-65-0345

Descriptors: (*Hydraulic fluids, Contamination), Elevating gear, Training gear, Drives, Hydraulic systems, Servomechanisms, Hydraulic fluid filters, Performance (Engineering).

The report reviews the findings of Phases I and II and adds information obtained with continuing efforts on Phase I. The findings of Phase III are discussed and reviewed. The subject of Phase I was a sample collection and field survey to determine the type, amount, and source of contaminants in the hydraulic fluid of Naval Missile launcher systems and gun pointing systems. Phase II comprised a filtration study to determine the relative capacities and efficiencies of filters currently in use in Navy train and elevation hydraulic drives for missile launchers. Such data would be of use in recommending filter type and rating for systems. Phase III was a test program, the objective of which was to determine the effect of various servo valve second stage parameters on valve operation in contaminated conditions. The parameters to be investigated were spool-bushing clearances,

bushing hardness, spool groove configuration, and spool finish. (Author)
AD-650 632 HC$3.00 MF$0.65

ROLLER STABILITY USING NEW SYNTHETIC LUBRICANTS,
Foreign Technology Div Wright-Patterson AFB Ohio
D. A. Draigor, and A. S. Venzhega. 23 Dec 66, 21p Rept no. FTD-HT-66-376
TT-67-61592
Unedited rough draft trans. of mono. Stoikost Balkov Chistovogo Kholodnogo Prokata, Moscow, 1964 p108-21.

Descriptors: (*Rolling mills, *Lubrication), (*Lubricants, Rolling mills), Rolling (Metallurgy), Coolants, Surface-active substances, Amides, Colloids, Additives, Fatty acid esters, USSR.

Use in the rolling process of a thin layer of lubricating-cooling liquid containing new synthetic surface-active substances reveals a greater effect on roller stability, the technological rolling process, and the properties of rolled metal. Best results for clutching resistance have been demonstrated by emulsions containing 2.5-5.% methylolamide. Sulfanate or oxyethylated amine can be used as emulgator. An increase in roller stability is gained by decreasing clutching. (Author)
AD-650 743 HC$3.00 MF$0.65

INVESTIGATION OF SOLID LUBRICANTS FOR HELICOPTER TRANSMISSIONS.
Final rept., Jul 65-Nov 66,
Westinghouse Research Labs Pittsburgh Pa
Paul H. Bowen. Mar 67, 81p Rept no. 66-9B3-LUBER-R4
USAAVLABS-TR-67-4
Contract DA-44-177-AMC-307 (T)

Descriptors: (*Helicopters, Transmissions), (*Transmissions, *Lubricants), Bearings, Gears, Lubrication, Oils, Polyamide plastics, Reinforced plastics, Halocarbon plastics, Composite materials, Molybdenum compounds, Sulfides, Films, Aviation safety, Reviews.
Identifiers: Dry-film lubricants, Self lubricating materials, Helicopter transmissions.

The feasibility of using solid lubricants in bearings and gears was demonstrated as a satisfactory method for preventing catastrophic failure and for providing emergency operation of helicopter transmissions in the event of an oil lubrication failure. Modified size-206 Conrad-type ball bearings with retainers of a glass reinforced polyimide, WRP-140, operated initially under a base line condition of oil lubrication for 40 hr. This was followed immediately by 0.5 hr of residual oil lubrication and 1.5 hr with no external lubrication at 14,000 rpm for various thrust loads of up to 800 lb without failure. Bearings with a silver alloy - Teflon composite, RB-HP-15 operated under similar oil and residual lubrication for 0.5 hr at loads of up to 450 lb before failure. A conventional 12 diametral pitch (DP) AISI 9310 gear set, using a 6-in. gear and a 2-in. pinion with a 2.5-in. idler of WRP-140, operated under base line conditions of oil lubrication for 40 hr at approximately 14,000 rpm and at a tooth load of 160 lb (640 lb/in. tooth width (ppi)). Similar gears with the same idler operated 0.5 hr with no external lubrication at a load of 1220 ppi (305 lb tooth load). With an RB-HP-15 idler, other gears were operated without lubrication for 0.5 hr at a load of 1220 ppi. (Author)
AD-650 763 HC$3.00 MF$0.65

NEWS IN MACHINE LUBRICANTS (CHAPTER IV AND V),
Foreign Technology Div Wright-Patterson AFB Ohio
M. V. Korovchinskii. 16 Feb 67, 141p Rept no. FTD-MT-65-401
TT-67-61601
Edited machine trans. of mono. Novoe O Smazke v Mashinakh, Moscow, 1964 p68-176.

Descriptors: (*Lubricants, *Rheology), (*Roller bearings, Lubrication), Cylindrical bodies, Elasticity, Hydrodynamics, Oils, Fluid flow, Compressive properties, Thermal properties, Viscosity, Friction, Thrust bearings, Bibliographies.

Limiting cases of a two-dimensional elasto-hydrodynamic problem for two cylinders with parallel generatrices are analyzed. The values are found for finite extension of a lubricating layer at which the oil flow deviates scarcely from a plane and the influence of compressibility of the lubricant and heat emission in the lubricating layer on its supporting power and pressure distribution in it is analyzed. The effect of a change is viscosity with the change in temperature on an adiabatic flow of an incompressible lubricant is examined. Experiments with small loads on cylinders are described. The above-mentioned problem is also analyzed for the case of local contact between generatrices and a method is given to solve a problem concerned with isothermal flow of a lubricant and relative slip of an elastic cylinder for small values of rigidity numbers. An extensive bibliography is included of the 1961 literature on theory and calculations of thrust bearings, and on lubricants.
AD-650 806 HC$3.00 MF$0.65

EFFECTS OF VISCOELASTIC LUBRICANT ON SQUEEZE FILM LUBRICATION BETWEEN IMPINGING SPHERES.
Technical rept.,
Mechanical Technology Inc Latham N Y
V. C. Mow. 24 Apr 67, 32p Rept no. MTI-67TR22
Contract N00014-66-C-0037

Descriptors: (*Lubrication, *Rheology), Lubricants, Films, Ball bearings, Viscoelasticity, Pressure, Partial differential equations, Spheres.

An asymptotic solution is obtained for squeeze flow between impinging spheres. The lubricant is assumed to be a four constant, nonlinear, viscoelastic liquid. The pressure peak in the lubricant is very sensitive to the values of viscoelastic constants. The results agree qualitatively with those observed experimentally. (Author)
AD-651 155 HC$3.00 MF$0.65

THE EFFECT OF HUMIDITY ON SOLID LUBRICANT FILMS.
Royal Aircraft Establishment, Farnborough (England).
E. Kay. Mar 65, 19p RAE-TR-65047

Descriptors: *Humidity, *Solid lubricant, *Thin film, Disulfide, Film, Friction, Graphite, Lubricant, Metal, Molybdenum, Performance, Solid, Substrate, Thin, Tungsten.

For abstract, see STAR 05 11.
N67-22787 HC$3.00 MF$0.65

THE BEHAVIOR OF LUBRICATION SYSTEM COMPONENTS IN A VACUUM ENVIRONMENT.
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
D. H. Buckley. 1967, 27p NASA-TM-X-52284
Presented At the 2d Aerospace Mech. Symp., Santa Clara, Calif., 4-5 May 1967

Descriptors: *Adhesion, *Evaporation, *Lubrication system, *Sliding friction, *Vacuum effect, *Wear, Chamber, Compound, Effect, Fluid, Friction, Grease, Inorganic, Lubricant, Lubrication, Material, Metal, Oil, Outgassing, Sliding, Soft, System, Vacuum.

For abstract, see STAR 05 11.
N67-23312 HC$3.00 MF$0.65

11I. PLASTICS

DEVELOPMENT OF AN INFLATABLE SELF-RIGIDIZING SPACE SHELTER AND SOLAR COLLECTOR FROM HONEYCOMB SANDWICH MATERIAL.
Geophysics Corp. of America, Anoka, Minn.
For primary bibliographic entry see Field 13M.
AD-440 225 HC$3.00

PLASTIC FLOW RATES IN NYLON INTERPRETED IN TERMS OF DISLOCATION MOTION,
Illinois Univ Urbana Dept of Mining Metallurgy and Petroleum Engineering
B. N. Dey. 1967, 25p
Contract Nonr-3985 (06)

Descriptors: (*Nylon, Plasticity), Filaments, Dislocations, Propagation, Creep, Molecular association, Crystal structure, Loading (Mechanics), Temperature, Heat of activation, Strain (Mechanics).

Observations of the propagation of plastic bandfronts in non-oriented Nylon 6-10 monofilaments were made as a function of load and temperature; and analyzed in terms of dislocation dynamics. From the shapes and the velocities of the bandfronts, dislocation velocities are estimated and found to have a stress-dependence similar to that found for non-polymeric crystalline materials. The maximum strain required to initiate flow in Nylon is about 40%, independent of the load and strain-rate, and in agreement with previous experiments of Miklowitz, and of Williams and Bender. Measurements by Williams and Bender for Nylon 66 were also analyzed. From the stress-dependence of creep incubation times reasonable values for the mean dislocation velocity in Nylon 66, and the associated activation energy, were obtained. It is tentatively concluded that the rate of breaking of hydrogen bonds limits dislocation mobility in Nylons 6-10 and 66. (Author)
AD-650 578 HC$3.00 MF$0.65

LADDER POLYQUINOXALINES,
Iowa Univ Iowa City Dept of Chemistry 1601
For primary bibliographic entry see Field 7D.
AD-650 707 Not available from CFSTI.

DEEP-OCEAN BIODETERIORATION OF MATERIALS. PART VI. ONE YEAR AT 2,370 FEET.
Naval Civil Engineering Lab Port Hueneme Calif
For primary bibliographic entry see Field 13J.
AD-651 124 HC$3.00 MF$0.65

POROUS PLASTIC BODY JACKET AND POROUS CERVICAL COLLAR.
Walter Reed Army Medical Center Washington D C Army Medical Biomechanical Research Lab
For primary bibliographic entry see Field 6E.
AD-651 212 HC$3.00 MF$0.65

TEMPERATURE LIMITATIONS OF POLYMERIC MATERIALS. PART 8 - CELLULAR PLASTICS.
Royal Aircraft Establishment, Farnborough (England).
G. Wood. Apr 64, 16p RAE-TN-CPM-54

Descriptors: *Mechanical property, *Plastic material, *Polymer, *Thermal property, Acetate, Carbazole, Cell, Cellulose, Chloride, Epoxy, Formaldehyde, Material, Mechanical, Plastic, Polyethylene, Polystyrene, Polyurethane, Property, Silicone, Temperature, Thermal, Thermoplastic, Vinyl.

For abstract, see STAR 05 11.
N67-22701 HC$3.00 MF$0.65

TEMPERATURE LIMITATIONS OF POLYMERIC MATERIALS. PART 2 - STRUCTURAL REINFORCED PLASTICS.
Royal Aircraft Establishment, Farnborough (England).
G. Wood. Feb 64, 15p RAE-TN-CPM-48

Descriptors: *Polymer, *Reinforced plastic, *Structural material, *Thermal property, Epoxy, Instability, Material, Mechanical, Phenol, Plastic, Polyester, Property, Reinforced, Silicone, Structural, Temperature, Thermal.

For abstract, see STAR 05 11.
N67-22702 HC$3.00 MF$0.65

TEMPERATURE LIMITATIONS OF POLYMERIC MATERIALS. PART 1 - GENERAL REVIEW.
Royal Aircraft Establishment, Farnborough (England).
G. Wood. Oct 63, 22p RAE-TN-CPM-34

Descriptors: *Mechanical property, *Polymer, *Thermostability, Adhesive, Dielectrics, Elastomer, Fiber, Film, High temperature, Mechanical, Plastic, Property, Reinforced, Structural, Thermal, Transparency.

For abstract, see STAR 05 11.
N67-22716 HC$3.00 MF$0.65

TEMPERATURE LIMITATIONS OF POLYMERIC MATERIALS. PART 7 - TRANSPARENCIES.
Royal Aircraft Establishment, Farnborough (England).
For primary bibliographic entry see Field 1C.
For abstract, see STAR 05 11.
N67-22782 HC$3.00 MF$0.65

STUDY OF BONDING BETWEEN GLASS AND PLASTIC IN GLASS-REINFORCED PLASTICS-EXTENDED WORK QUARTERLY PROGRESS REPORT, OCT. 1 - DEC. 31, 1966.
Stanford Research Inst., Menlo Park, Calif.
D. L. Chamberlain, Jr., 23 Mar 67, 8p NASA-CR-83420, REPT.-11
Contract NASR-49/14/

Descriptors: *Bonding, *Composite material, *Glass, *Plastic material, *Reinforced material, Alkylation, Analysis, Carbon, Chemical, Composite, Effect, Fluorination, Infrared, Material, Modification, Plastic, Reaction, Reinforced, Surface.

For abstract, see STAR 05 11.
N67-22875 HC$3.00 MF$0.65

EFFECT OF COMPOSITION, DENSITY, AND ENVIRONMENT ON THE ABLATIVE PERFORMANCE OF PHENOLIC NYLON.
National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
W. D. Brewer, R. K. Clark, and R. T. Swann. Apr 67, 30p NASA-TN-D-3908
Contract 124-08-03-16-23

Descriptors: *Ablating material, *Nylon, *Phenol resin, Ablation, Char, Composition, Density, Environment, Material, Phenol, Property, Protection, Resin, Spallation, Thermal.

For abstract, see STAR 05 11.
N67-23294 HC$3.00 MF$0.65

DETERMINATION OF KINETIC PARAMETERS OF SIX ABLATION POLYMERS BY THERMOGRAVIMETRIC ANALYSIS.
National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
J. B. Nelson. Apr 67, 42p NASA-TN-D-3919
Contract 129-03-12-03-23

Descriptors: *Ablating material, *Polymer, *Thermal degradation, *Thermogravimetry, Ablation, Composite, Degradation, Formaldehyde, Heat, Kinetics, Loss, Mass, Material, Nylon, Phenol, Plastic, Protection, Shield, Silicone, Thermal.

For abstract, see STAR 05 11.
N67-23298 HC$3.00 MF$0.65

INVESTIGATIONS LEADING TO IMPROVED DENTAL RESTORATIVE MATERIALS.
Alpha Research and Development, Inc., Blue Hill, Ill.
For primary bibliographic entry see Field 6E.
PB-174 453 HC$3.00 MF$0.65

SYNTHESIS AND EVALUATION OF POLYURETHANE ELASTOMERS.
Technical rept.,
Rock Island Arsenal, Ill.
W. M. Veroeven. 17 Apr 63, 17p Rept. no. 63-1242

Descriptors: (*Synthesis (Chemistry), *Isocyanate plastics), (*Elastomers, Isocyanate plastics), Physical properties, Temperature, Heat, Elasticity, Tensile properties, Heat-resistant plastics, Polymers, Armed forces research.

Commercially available castable, millable and/or injection moldable polyurethane elastomers were evaluated to determine their characteristics and potential use for Army applications. Experimental polyurethanes were synthesized using various polyols, polyamines and stabilizing agents in an effort to improve the heat stability in the range 149 to 204C. It was shown that retention of strength at elevated temperature can be improved by increased functionality in the system, but only at the expense of the elastic characteristics of the material. The increased crosslinking of the millable gums offers the most promise for heat resistant polyurethanes. (Author)
PB-174 535 HC$3.00 MF$0.65

11J. RUBBERS

THE CHARACTERIZATION OF ETHYLENE-PROPYLENE VULCANISATES.
Technical rept.,
Royal Aircraft Establishment Farnborough (England)
B. B. Moore, and D. K. Thomas. Dec 66, 22p
Rept no. TR-66388

Descriptors: (*Elastomers, Test methods), (*Polyethylene plastics, Test methods), (*Vulcanizates, Test methods), Stresses, Strain (Mechanics), Deformation, Elasticity, Kinetic theory, Tensile properties, Compressive properties, Test equipment, Ethylenes, Propenes, Polymers, Great Britain.

Stress-strain measurements on dry rubbers are not a good method of characterising ethylene-propylene vulcanisates. Similar measurements on rubbers swollen to equilibrium in n-heptane show excellent agreement with the requirements of the kinetic theory of rubberlike elasticity in both tension and compression, and therefore represent the best means of determining the elastic constant directly. A single point method was developed for evaluating the elastic constant in compression. Existing methods of analysing compression modulus data are shown to be unsuitable for the EP vulcanisates covered by the present work. (Author)
AD-650 942 HC$3.00 MF$0.65

DEEP-OCEAN BIODETERIORATION OF MATERIALS. PART VI. ONE YEAR AT 2,370 FEET.
Naval Civil Engineering Lab Port Hueneme Calif
For primary bibliographic entry see Field 13J.
AD-651 124 HC$3.00 MF$0.65

BROADBAND LASER DIGITAL DEFLECTOR.
Army Electronics Command Fort Monmouth NJ
For primary bibliographic entry see Field 20E.
AD-651 220 HC$3.00 MF$0.65

TEMPERATURE LIMITATIONS OF POLYMERIC MATERIALS PART 6 - ELASTOMERS.
Royal Aircraft Establishment, Farnborough (England).
G. Wood. Apr 64, 40p RAE-TN-CPM-52

Descriptors: *Elastomer, *Mechanical property, *Sealant, *Thermal property, Acrylic, Butyl, Fluorocarbon, Mechanical, Polymer, Polysulfide, Property, Rubber, Silicone, Temperature, Thermal.

For abstract, see STAR 05 11.
N67-22711 HC$3.00 MF$0.65

CONTINUATION OF SWELLING TESTS OF CABLE SLEEVES IN 4 TYPES OF OIL.
Voortgezette Zwelproeven Met Mantels Van Een Aantal Kabels in 4 Oliesoorten
Rubber Research Inst. TNO, Delft (Netherlands).
H. Geldof. 10 Nov 66, 4p TDCK-46585
in Dutch

Descriptors: *Electric insulation, *Material testing, *Plastic material, Cable, Chloride, Diesel, Electric, Hardness, Hypalon, Immersion, Insulation, Material, Neoprene, Oil, Plastic, Sleeve, Swelling, Testing.

For abstract, see STAR 05 11.
N67-23090 HC$3.00 MF$0.65

SYNTHESIS AND EVALUATION OF POLYURETHANE ELASTOMERS.
Rock Island Arsenal, Ill.
For primary bibliographic entry see Field 11I.
PB-174 535 HC$3.00 MF$0.65

11K. SOLVENTS, CLEANERS, AND ABRASIVES

STUDY OF SOLUTION DEOXYGENATION AND SPECIMEN PRETREATMENT TECHNIQUES FOR USE IN THE HYDROGEN PERMEATION APPARATUS.
Naval Air Engineering Center Philadelphia Pa Aeronautical Materials Lab
For primary bibliographic entry see Field 11F.
AD-651 211 HC$3.00 MF$0.65

11L. WOOD AND PAPER PRODUCTS

DEEP-OCEAN BIODETERIORATION OF MATERIALS. PART VI. ONE YEAR AT 2,370 FEET.
Naval Civil Engineering Lab Port Hueneme Calif
For primary bibliographic entry see Field 13J.
AD-651 124 HC$3.00 MF$0.65

MEASURING SURFACE IRREGULARITIES IN PANEL PRODUCTS.
Research note,
Forest Products Lab Madison Wis
B. G. Heebink. Apr 67, 4p Rept no. FPL-0159
Prepared in cooperation with Wisconsin Univ., Madison.

Descriptors: (*Panels (Structural), Test methods), (*Wood, Test methods), Surface properties, Deformation, Photographic analysis, Test equipment.

A method was developed which permits an approximate measurement of vertical deformation

in wood panel surfaces. A narrow slit of bright light directed at a tightly stretched wire so as to cast a shadow on an inclined test surface. A photograph, taken from directly above, reveals any irregularities by the form of the shadow so cast.
AD-651 125 HC$3.00 MF$0.65

COMPARISON OF WOOD PRESERVATIVES IN MISSISSIPPI POST STUDY.
Research note,
Forest Products Lab Madison Wis
J. O. Blew. Apr 67, 28p Rept no. FPL-01
Prepared in cooperation with Wisconsin Univ., Madison.

Descriptors: (*Wood, *Preservation), (*Protective treatments, Wood), Environmental tests, Mississippi, Weatherproofing, Evaluation.

The report contains service life data on three installations of southern pine tests, after 26 to 30 years, after 17-1/2 years, and after 2 years of service respectively. (Author)
AD-651 126 HC$3.00 MF$0.65

DETERMINING SCATTERING AND ABSORPTION COEFFICIENTS BY DIFFUSE ILLUMINATION.
Research note,
Forest Products Lab Madison Wis
F. A. Simmonds, and C. L. Coens. Apr 67, 14p
Rept no. FPL-0162
Prepared in Cooperation with Wisconsin Univ., Madison.

Descriptors: (*Paper, Optical properties), (*Wood pulp, Optical properties), Scattering, Absorption, Test methods, Evaluation, Reflectometers, Optical filters, Monochromatic light.

Opacity is a highly important use requirement of printing papers. Fundamental to the optical property of opacity are the light scattering and the absorptive powers of the paper. Two methods for measuring these optical properties of paper and pulp were evaluated and compared. A method using a reflectometer with filters was found to produce sufficiently accurate results in less time than a method in which a reflectometer with a monochromator was used. (Author)
AD-651 127 HC$3.00 MF$0.65

CHARRING RATE OF SELECTED WOODS--TRANSVERSE TO GRAIN.
Research paper,
Forest Products Lab Madison Wis
E. L. Schaffer. Apr 67, 28p Rept no. FPL-69
Prepared in Cooperation with Wisconsin Univ., Madison.

Descriptors: (*Wood, Pyrolysis), Plywood, Fire safety, Combustion products, Density, Moisture, Temperature, Reaction kinetics.

A study was designed to determine the charring rates for wood normal to the grain, and to evaluate the effect of fire intensity, species, specific gravity, moisture content, and annual ring orientation on these rates. Other material variables studied were the springwood to summerwood ratio and volatile extractive content. The effect of variation in moisture permeability, however, was not evaluated. Laminated wood slabs, 3 inches thick, of Douglas-fir, southern pine, and white oak were vertically exposed to fire on one surface. The rate of char development was constant when the specimens were exposed to uniformly increasing fire temperatures; charring rates at three constant fire exposure temperatures were described by a pseudo-first-order reaction equation with an Arrhenius temperature-dependent rate constant. Rates of char development in each species were related to the specific gravity and moisture content of the wood. The other material characteristics considered were directly related to specific gravity and moisture content or had no significant effect on the charring rate. (Author)
AD-651 143 HC$3.00 MF$0.65

PULPWOOD PRODUCTION IN THE NORTHEAST 1964.
Northeastern Forest Experiment Station, Upper Darby, Pa.
For primary bibliographic entry see Field 2F.
PB-174 585 HC$3.00 MF$0.65

A LOOK AT BLACK WALNUT TIMBER RESOURCES AND INDUSTRIES.
Northeastern Forest Experiment Station, Upper Darby, Pa.
For primary bibliographic entry see Field 2F.
PB-174 586 HC$3.00 MF$0.65

PULPWOOD PRODUCTION IN THE NORTHEAST 1963.
Northeastern Forest Experiment Station, Upper Darby, Pa.
For primary bibliographic entry see Field 2F.
PB-174 588 HC$3.00 MF$0.65

THE MARKET FOR FIREPLACE WOOD IN AN URBAN AREA OF CONNECTICUT.
Research paper,
Northeastern Forest Experiment Station, Upper Darby, Pa.
George S. Nagle, and Robert S. Manthy. 1966, 19p RP-NE-51

Descriptors: (*Wood, Commerce), Urban areas, Connecticut, Economics.

The article describes the market for fireplace wood, now Connecticut's most important primary timber product, in the New Haven area. Emphasis is placed on sources of supply and marketing practices. (Author)
PB-174 589 HC$3.00 MF$0.65

COSTS AND RETURNS FOR HARDWOOD LUMBER PRODUCTION IN THE APPALACHIAN REGION OF KENTUCKY AND OHIO.
Research paper,
Northeastern Forest Experiment Station, Upper Darby, Pa.
James C. Whittaker, and Orris D. McCauley. 1966, 14p RP-NE-55

Descriptors: (*Wood, Economics), Industrial production, Costs, Kentucky, Ohio.

A study was made of costs and returns at seven circular sawmills revealed how unit costs vary with types of markets for which lumber is produced, volume sawed annually, and amount of processing and seasoning done to lumber produced. Suggests how managers should direct cost-control efforts to increase operating profits.
PB-174 592 HC$3.00 MF$0.65

12. MATHEMATICAL SCIENCES

12A. MATHEMATICS AND STATISTICS

OPTIMAL CONTROL OF CONTINUOUS-TIME STOCHASTIC SYSTEMS.
Research rept.,
California Univ., Berkeley. Electronics Research Lab.
R. E. Mortensen. 19 Aug 66, 116p ERL-66-1
AFOSR-67-0424
Grants AF-AFOSR-139-64, AF-AFOSR-139-65

Descriptors: (*Control systems, Optimization), Functional analysis, Dynamic programming, Feedback, Nonlinear systems, Probability, Stochastic processes, Integral equations, Differential equations, Integrals, Statistical processes, Time.
Identifiers: Function space integration.

This report is concerned with determining the optimal feedback control for continuous-time, continuous-state, stochastic, nonlinear, dynamic systems when only noisy observations of the state are available. At each instant of time, the current value of the control is a functional of the entire past history of the observations. The principal mathematical apparatus used in this investigation is the following: (1) The theory of probability measures and integration on infinite dimensional function spaces, (2) The ITO stochastic calculus for differentiation and integration of random functions, (3) The Frechet derivative of a functional on an infinite dimensional function space, and (4) Dynamic programming. In sections I and II, items (1) and (2) above are used to establish rigorously sufficient conditions for the existence of a conditional probability density for the current state of the system given the entire past history of the observations. A rigorous derivation is then given of a stochastic integral equation which is obeyed by an unnormalized version of the desired conditional density. In section III, items (3) and (4) above are used heuristically to obtain a stochastic Hamilton-Jacobi equation in function space. It is shown that the solution of this equation would yield the desired feedback control. (Author)
AD-489 159 HC$3.00 MF$0.65

TABLES OF SPHEROIDAL WAVE FUNCTIONS. PART 2 - PROLATE RADIAL FUNCTIONS OF THE FIRST AND SECOND TYPE.
Naval Research Lab Washington D C
S. Hanish, R. V. Baier, W. H. Buckler, and Berthel K. Carmichael. 31 Jan 67, 385p Rept no. NRL-6502
See also AD-646 793.

Descriptors: (*Wave functions, Tables), Electromagnetic waves, Mechanical waves, Acoustics, Scattering, Diffraction, Underwater sound, Geometry.

The theory of prolate spheroidal wave functions is briefly reviewed. Formulas useful for the numerical calculation of prolate radial function of the first and second type, together with their first derivatives, are derived and explained. A step-by-step procedure of computation is then outlined together with an indication of precision achieved and method of checking. Finally a computer-printout tabulation of 66,600 entries comprising prolate radial functions and their first derivatives of both types is reproduced. The range of parameters m, l, h, and xi covered in these tables is m=0 and 1, l=m (1)18, h=0.1 (0.1)1 (0.2)8, and xi=1.01 (0.01) 1.10. (Author)
AD-650 575 HC$3.00 MF$0.65

ON THE ASYMPTOTIC DIRECTIONS OF THE S-DIMENSIONAL OPTIMUM GRADIENT METHOD.
Technical rept.,
Stanford Univ Calif Dept of Computer Science
George E. Forsythe. 13 Apr 67, 47p Rept no. CS-61
Contract Nonr-225 (37)

Descriptors: (*Functions, *Optimization), Saddle point method, Convergence, Matrix algebra.

The optimum s-gradient method for minimizing a positive definite quadratic function f (x) on E sub n has long been known to converge for s > or = 1. For these s the author studies the directions from which the iterates x sub k approach their

limit, and extends to s > 1 a theory proved by Akaike for s = 1. It is shown that f (s sub k) can never converge to its minimum value faster than linearly, except in degenerate cases where it attains the minimum in one step. (Author)
AD-650 619 HC$3.00 MF$0.65

VARYING LENGTH FLOATING POINT ARITHMETIC: A NECESSARY TOOL FOR THE NUMERICAL ANALYST.
Technical rept.,
Stanford Univ Calif Dept of Computer Science
Martti Tienari. 17 Apr 67, 42p Rept no. CS-62
Contract Nonr-225 (37)
Research supported in part by NSF.

Descriptors: (*Numerical analysis, Accuracy), (*Programmers, Problem solving), Errors, Control systems, Computer personnel, Programming languages, Computer operators, Specifications, Digital computers, Algorithms.

The traditional floating point arithmetic of scientific computers is biased towards fast and easy production of numerical results without enough provision to enable the programmer to control and solve problems connected with numerical accuracy and cumulative round-off errors. The report suggests the varying length floating point arithmetic as a general purpose solution for most of these problems. Some general philosophies are outlined for applications of this feature in numerical analysis. The idea is analyzed further discussing hardware and software implementations.
AD-650 620 HC$3.00 MF$0.65

GRAEFFE'S METHOD FOR EIGENVALUES.
Technical rept.,
Stanford Univ Calif Dept of Computer Science
G. Polya. 24 Apr 67, 13p Rept no. CS-63
Contract Nonr-225 (37)

Descriptors: (*Power series, Algorithms), (*Bessel functions, Convergence), Polynomials, Sequences, Inequalities, Theorems, Determinants.

Let an entire function F (z) of finite genus have infinitely many zeros which are all positive, and take real values for real z. Then it is shown how to give two-sided bounds for all the zeros of F in terms of the coefficients of the power series of F, and of coefficients obtained by Graeffe's algorithm applied to F. A simple numerical illustration is given for a Bessel function.
AD-650 627 HC$3.00 MF$0.65

LOWER ORDER LINEAR FILTERING AND PREDICTION OF NONSTATIONARY RANDOM SEQUENCES.
Final rept.,
Frank J Seiler Research Lab United States Air Force Academy Colo
K. G. Brammer. 10 Feb 67, 37p Rept no. SRL-67-0003

Descriptors: (*Sequences, *Mathematical prediction), (*White noise, Linear systems), Difference equations, Signals, Sensors, Errors, Integral equations, Matrix algebra, Numerical analysis, Functions, Interpolation.

The method of Kalman and Bucy for the optimal linear filtering and prediction of nonstationary sample functions has been modified by Bryson and Johansen. They do not require all measurements to contain white noise. The observations without white noise and some of their derivatives are used to reduce the order of the optimal filter. An analogous philosophy is applied here in the discrete time case. The purpose is to specify a lower order optimal filter, in the presence of measurements free of white noise. In a self-contained derivation, the optimal filter is shown to consist of a dynamical part in the form of a difference equation, and a direct algebraic feed-forward path parallel to it. The order of the dynamical part is n-p, where n is the combined number of state variables of the observed signal and noise processes, and p is the number of measurements without white noise. The parameters of the optimal filter are specified by a set of recurrence equations, similar to those of the discrete-time Kalman filter.
AD-650 641 HC$3.00 MF$0.65

DAS MATHEMATISCHE WERK VON FELIX HAUSDORFF (The Mathematical work of F. Hausdorff),
Syracuse Univ N Y Dept of Mathematics 3334
For primary bibliographic entry see Field 51.
AD-650 656 Not available from CFSTI.

ACCURACY AND CONSISTENCY IN THE REVISION OF SUBJECTIVE PROBABILITIES,
Michigan Univ Ann Arbor Inst of Science and Technology
For primary bibliographic entry see Field 5J.
AD-650 681 Not available from CFSTI.

REVISION OF CONTINUOUS SUBJECTIVE PROBABILITY DISTRIBUTIONS,
Michigan Univ Ann Arbor Inst of Science and Technology
For primary bibliographic entry see Field 5J.
AD-650 684 Not available from CFSTI.

COMPUTATIONAL METHODS FOR DETERMINING LOWER BOUNDS FOR EIGENVALUES OF OPERATORS IN HILBERT SPACE,
Maryland Univ College Park Inst for Fluid Dynamics and Applied Mathematics
David W. Fox, and Werner C. Rheinboldt. 22 Mar 66, 39p
AROD-407:74
Grant DA-ARO (D)-31-124-G563
Research supported in part by Johns Hopkins Univ., Applied Physics Lab.
Availability: Published in SIAM Review, v8 n4, Oct 1966.

Descriptors: (*Hilbert space, *Operators (Mathematics)), (*Boundary value problems, Partial differential equations), Theorems, Problem solving, Sequences, Numerical analysis, Computers, Set theory.

A survey of computational methods for determining lower bounds for eigenvalues of semibounded, self-adjoint operators in Hilbert space, in particular, of many operators associated with boundary value problems for ordinary and partial differential equations of mathematical physics and engineering is presented. A summary of relevant definitions and theorems for semi-bounded, self-adjoint operators in Hilbert space is provided. Comparison operators are discussed, and a construction of a family of comparison operators and the technique of special choice is presented. A method using truncations is discussed, and the solution of the resulting eigenvalue problems is covered. The appendix contains a brief introduction to the theory of a class of ordinary differential operators frequently encountered in applications.
AD-650 716 Not available from CFSTI.

BROADENING OF ISOLATED LINES IN THE IMPACT APPROXIMATION USING A DENSITY MATRIX FORMULATION,
Colorado Univ Boulder
For primary bibliographic entry see Field 3B.
AD-650 737 Not available from CFSTI.

A GEOMETRIC SIMULTANEOUS MULTISTATION DETERMINATION, WITH CONSTRAINTS, USING DATA FROM GEODETIC SATELLITES.
Army Engineer Geodesy Intelligence and Mapping Research and Development Agency Fort Belvoir Va
For primary bibliographic entry see Field 22B.
AD-650 739 HC$3.00 MF$0.65

MAINTENANCE POLICIES AND DISCIPLINES IN MULTI-CHANNEL SYSTEMS AND MARKOVIAN MULTI-SERVICE TYPE SYSTEMS.
Columbia Univ New York Operations Research Group
For primary bibliographic entry see Field 12B.
AD-650 792 HC$3.00 MF$0.65

A STOCHASTIC MODEL OF THE FREQUENCY AND DURATION OF WEATHER EVENTS,
Air Force Cambridge Research Labs L G Hanscom Field Mass
For primary bibliographic entry see Field 4B.
AD-650 947 Not available from CFSTI.

THE COMPUTATION OF POWER SPECTRAL DENSITY,
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
R. B. McDowell. 18 Sep 63, 30p Rept no. CF-3053
Contract NOw-62-0604

Descriptors: (*Statistical functions, Mathematical models), (*Power spectra, Mathematical models), Sampling, Tests, Signal-to-noise ratio.
Identifiers: Power spectral density.

This paper describes the physical and mathematical concepts necessary to compute power spectral density (PSD). The computation of PSD is one of several ways to analyze complex or random time functions. The object is to determine the frequency content of such functions and then to apply standard frequency analysis techniques to determine the effects on a given physical system. PSD can, for at least some problems, bridge the gap between statistical phenomena and standard analysis methods.
AD-650 995 HC$3.00 MF$0.65

ON A CLASS OF CONVEX AND NON-ARCHIMEDEAN SOLUTION CONCEPTS FOR n-PERSON GAMES.
Systems research memo.,
Northwestern Univ Evanston Ill Technological Inst
A. Charnes, and K. Kortanek. Mar 67, 24p Rept no. SRM-172
Contracts Nonr-1228 (10), Da-31-124-ARO (D)-322
Prepared in cooperation with Cornell Univ., Technical rept. no. 22.

Descriptors: (*Game theory, *Linear programming), (*Topology, *Real numbers), Value engineering, Polynomials, Theorems, Inequalities, Set theory, Matrix algebra, Vector analysis, Sequences.

Recently D. Schmeidler developed an interesting solution concept, called the nucleolus of a game, for characteristic function n-person games taking values in the real number field. By using elementary topology Schmeidler proves existence and uniqueness properties and also shows that the nucleolus belongs to the core of the game. This paper develops a general class of solution concepts termed nuclei which generalize the nucleolus and which are defined for n-person games which take values in any arbitrarily ordered field. These nuclei are in general independent of any topological considerations and possess unicity properties as well as core membership. When a topology is introduced, a wide class of convex nuclei is presented which is contained in the core and which correspond to a class of (strictly) convex functions of the excesses of the game values over the payoff values on coalitions. Finally, by introducing non-Archimedean elements to the base field, preemptive nuclei

are constructed which correspond to only a few (arbitrarily chosen) preemptive orderings on the excesses and which are unique and contained in the core.
AD-651 037 HC$3.00 MF$0.65

TECHNIQUES IN INTRINSIC ANALYSIS.
Final rept., 1 Nov 65-31 Oct 66,
Systems Research Labs Inc Dayton Ohio 3603
Robert M. Colomb. 31 Nov 66, 69p
AFCRL-67-0153
Contract AF 19(628)-5657

Descriptors: (*Functional analysis, *Approximation (Mathematics)), (*Correlation techniques, Statistical analysis), Errors, Matrix algebra, Algorithms, Factor analysis, Iterations, Approximation (Mathematics).

Intrinsic analysis is a data reduction technique which allows a set of data vectors to be approximated to a given mean square error by a minimum number of coefficients. This report develops the analysis, showing the relation to other developments and proves several results about the relation between the row space and column space of matrices. The problem of error propagation and control is considered from several points of view and the effect of ambiguous data on the algebraic eigenvalue problem discussed. Finally, a survey is made of computational algorithms for the algebraic eigenproblem for large ambiguous second momet matrices, and two new algorithms proposed: one for very large matrices and the other for complex hermitian matrices.
AD-651 071 HC$3.00 MF$0.65

UBER POINCARESCHE REIHEN ZUR SIEGELSCHEN MODULGRUPPE (On Poincares Series for Siegel's Modular Group),
Institute for Advanced Study Princeton N J
Helmut Klingen. 12 Dec 65, 14p
Grant DA-ARO (D)-31-124-G632
Text in German.
Availability: Published in Math. Annalen v168 p157-70 1967.

Descriptors: (*Series, *Groups (Mathematics)), West Germany.
Identifiers: Poincare series.
AD-651 080 Not available from CFSTI.

BEMERKUNGEN ZUR KONVERGENZ VON POINCARESCHEN REIHEN (Observations on Convergence of Poincares series),
Institute for Advanced Study Princeton N J
Von Helmut Klingen. 1966, 13p
Grant DA-ARO (D)-31-124-G632
Text in German.
Availability: Published in Nachrichten der Akademie der Wissenschaften in Gottingen II. Mathematisch-Physikalische Klasse n1 p1-9 Jan 1966.

Descriptors: (*Series, Convergence), West Germany.
Identifiers: Poincare series.
AD-651 081 Not available from CFSTI.

METHOD OF POTENTIAL FUNCTIONS IN THE PROBLEM OF RECONSTRUCTION OF THE CHARACTERISTIC OF A FUNCTIONAL CONVERTER ACCORDING TO RANDOMLY OBSERVED POINTS,
Foreign Technology Div Wright-Patterson AFB Ohio
M. A. Aizerman, E. M. Braverman, and L. I. Rozonoer. 20 Feb 67, 23p Rept no. FTD-MT-64-534
TT-67-61681
Metod Potentsialnykh Funktsii v Zadache o Vosstanovlenii Kharakteristiki Funktsionalnogo Preobrazovatelya po Sluchaino Nablyudaemym Tochkam, edited machine trans. of Problems Rasshireniya Vozmozhnostei Avtomatov (sic), n3 23p 1964.

Descriptors: (*Functions, *Computer logic), USSR, Algorithms, Equations, Automation, Input-output devices, Matrix algebra.

The method of potential functions is used to construct algorithms that allow approximate reconstruction of the characteristic of an unknown functional multi-input converter according to results of random observations of its work. The convergence of the algorithms is proven. In an example of the solution of a system of linear equations (i.e. the problem of matrix inversion), it is shown that the proposed algorithms can also be used to solve certain problems of computer mathematics. The problem of reconstructing the characteristic of a converter in the presence of interferences is also considered. (Author)
AD-651 091 HC$3.00 MF$0.65

SOME TOTAL INVARIANTS OF ASYMPTOTICALLY FLAT SPACE-TIMES,
Aerospace Research Labs Wright-Patterson AFB Ohio
J. Winicour. 1967, 29p

Descriptors: (*Invariance, *Topology), Transformations (Mathematics), Groups (Mathematics), Conformal mapping, Integrals.

The total energy, momenta, supermomenta, and angular momenta of asymptotically flat spacetimes are calculated in terms of coordinate and conformally invariant expressions by taking the limit in an invariant way of the asymptotic symmetry linkages through a sequence of finite closed two-spaces which converge to a sphere at null infinity. The resulting expressions consist of integrals over the sphere at null infinity of coordinate and conformally invariant quantities. In the case of energy and momentum these integrals may be reduced to expressions previously proposed by Penrose. (Author)
AD-651 096 HC$3.00 MF$0.65

BIBLIOGRAPHY OF CLASSICAL AND CONTAGIOUS DISCRETE DISTRIBUTIONS,
Pennsylvania State Univ University Park
Ganapati P. Patil, and Sharadchandra W. Joshi.
Sep 66, 278p
ARL-66-0185
Contract AF 33 (615)-2763

Descriptors: (*Statistical distributions, Bibliographies), Probability, Distribution functions, Reports.

The report provides a bibliography of classical and contagious discrete distributions which lists 2113 publications in statistics and probability discussing discrete distributions in general. Publications in other fields discussing applications of these distributions were also included. Textbooks as a class were excluded, but the more intimate ones were included. Technical reports and dissertations were treated as published papers. A systematic search was made for most of the entries published in English during the period ending 1964. Some of the later publications discovered and found relevant are also included. The original objective of achieving comprehensive coverage of non-English publications was partially abandoned due to lack of adequate resources. (Author)
AD-651 113 HC$3.00 MF$0.65

A FORMAL SYSTEM FOR THE LOGICAL ANALYSIS OF TEMPORAL RELATIONSHIPS BETWEEN INTERVALS OF TIME,
Rand Corp Santa Monica Calif
For primary bibliographic entry see Field 9B.
AD-651 122 HC$3.00 MF$0.65

THE TROJAN MANIFOLD IN THE SYSTEM EARTH-MOON,
Boeing Scientific Research Labs Seattle Wash Mathematics Research Lab
For primary bibliographic entry see Field 3C.
AD-651 147 HC$3.00 MF$0.65

OPTIMAL REPRESENTATION OF A FUNCTION AS A LINEAR COMBINATION OF FUNCTIONS,
Boeing Scientific Research Labs Seattle Wash Mathematics Research Lab
George Marsaglia. Mar 67, 14p Rept no. D1-82-0610, Mathematical note-508

Descriptors: (*Functions, Optimization), Equations, Monte Carlo method, Probability, Approximation (Mathematics), Algorithms, Linear programming, Random variables.

This paper discusses the approximation of a given density function g (x) with a linear combination of densities f sub one (x), f sub two (x), ... f sub n (x) in such a way that the approximation has maximum area but always lies below the given function.
AD-651 148 HC$3.00 MF$0.65

CONVEX FUNCTIONS ON CONVEX POLYTOPES,
Boeing Scientific Research Labs Seattle Wash Mathematics Research Lab
David Gale, Victor Klee, and R. T. Rockafellar.
Mar 67, 15p Rept no. D1-82-0607, Mathematical note-507
Grants AFOSR-1202-67, NSF-GP-3579

Descriptors: (*Functions, Optimization), Convex sets, Theorems.
Identifiers: Convex functions.

The behavior of convex functions is of interest in connection with a wide variety of optimization problems. It is shown here that this behavior is especially simple, in certain respects, when the domain is a polytope or belongs to certain classes of sets closely related to polytopes; moreover, the polytopes and related classes are actually characterized by this simplicity of behavior.
AD-651 157 HC$3.00 MF$0.65

AN EXTENSION OF THE KANTOROVICH METHOD,
New York Univ N Y Dept of Aeronautics and Astronautics
Arnold D. Kerr. Aug 66, 22p Rept no. NYU-AA-66-70
AFOSR-66-2794
Grant AF-AFOSR-813-66

Descriptors: (*Boundary value problems, *Numerical methods and procedures), Beams (Structural), Torsion, Stresses, Convergence, Iterative methods, Numerical analysis.
Identifiers: Kantorovich method.

An extension of the Kantorovich method is proposed. The suggested method is demonstrated on the torsion problem of a beam of rectangular cross section. It is found that even when the solution is restricted to a one term approximation, the method generates very good results also for stresses which are obtained as derivatives of the solution. It is also found that the convergence of the iterative process is very rapid. The obtained results indicate that the proposed method is a powerful tool to generate close approximate solutions thus eliminating an inherent shortcoming in the Ritz and Galerkin methods, namely the arbitrariness in the choice of an approximate solution. (Author)
AD-651 206 HC$3.00 MF$0.65

INTEGRATION OF CONTROL EQUATIONS AND THE PROBLEM OF SMALL TIME CONSTANTS.

National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
J. F. Andrus. Apr 67, 42p NASA-TN-D-3907

Descriptors: *Differential equation, *Numerical integration, *Time constant, Canonical, Coefficient, Constant, Differential, Eigenvalue, Equation, Function, Integration, Linear, Nonlinear, Numerical, Small, Time.

For abstract, see STAR 05 11.
N67-21960 HC$3.00 MF$0.65

ON THE THEORY AND METHODS OF STATISTICAL INFERENCE.
National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
G. L. Smith. Apr 67, 34p NASA-TR-R-251

Descriptors: *Bayesian statistics, *Least squares method, *Mathematical model, *Statistical decision theory, Data, Decision, Error, Estimation, Filtering, Inference, Least, Mathematics, Maximum, Method, Model, Observation, Optimal, Parameter, Prediction, Probability, Smoothing, Square, State, Statistics, Theory, Vector.

For abstract, see STAR 05 11.
N67-22039 HC$3.00 MF$0.65

CALCULATION OF FACTORIALS.
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
M. L. Charnow, and J. L. Maury, Jr.. Sep 66, 4p NASA-TM-X-55733, X-542-66-460

Descriptors: *Canonical problem, *Problem solving, Calculation, Canonical, Decomposition, Exponent, Factorial, Finish, Mathematics, Problem, Solution.

For abstract, see STAR 05 11.
N67-22079 HC$3.00 MF$0.65

LINEAR EIGENVALUE PROBLEMS OF ARBITRARY ORDERS WITH DISSOCIATE BOUNDARY CONDITIONS.
Lineare Eigenwertprobleme Beliebiger Ordnung Mit Zerfallenden Randbedingungen
Kernforschungsanlage, Juelich (West Germany). Zentralinstitut Fuer Angewandte Mathematik.
W. Eberhard. Jun 64, 95p JUL-176-MA
in German

Descriptors: *Boundary value problem, *Differential equation, *Eigenvalue, *Fourier series, *Green function, *Random number, Boundary, Condition, Convergence, Differential, Dissociation, Divergence, Equation, Function, Linear, Number, Order, Problem, Random, Value.

For abstract, see STAR 05 11.
N67-22096 HC$3.00 MF$0.65

ANALYTICAL PERTURBATION THEORY IN RELATION TO THE THREE BODIES PROBLEM APPLYING THE REGULATING VARIABLES.
Eidgenossische Technische Hochschule, Zurich (Switzerland).
For primary bibliographic entry see Field 3B.
For abstract, see STAR 05 11.
N67-22100 HC$3.00 MF$0.65

A MATRIX FORMULATION FOR THE TIME RESPONSE OF TIME-INVARIANT LINEAR SYSTEMS TO DISCRETE INPUTS.
Royal Aircraft Establishment, Farnborough (England).
E. Huntley. Feb 66, 39p RAE-TR-66038

Descriptors: *Linear system, *Matrix algebra, *Time response, Algebra, Discrete, Filter, Function, Input, Invariance, Linear, Matrix, Response, System, Table, Time, Vector.

For abstract, see STAR 05 11.
N67-22703 HC$3.00 MF$0.65

RIGOROUS LOWER BOUND ON THE COMPRESSIBILITY OF A CLASSICAL SYSTEM.
Laboratoire de Physique Theorique Et des Hautes Energies, Orsay (France).
J. Ginibre. Dec 66, 5p TH-179

Descriptors: *Canonical problem, *Classical mechanics, *Compressible boundary layer, *Inequality (math), *Theoretical physics, Application, Boundary, Canonical, Classical, Compressible, Density, Euclidean space, Function, Layer, Mathematics, Mechanics, Particle, Physics, Pressure, Problem, System, Theoretical.

For abstract, see STAR 05 11.
N67-22933 HC$3.00 MF$0.65

THE DIFFERENTIAL-DIFFERENCE EQUATION ALPHA XF'/X/ PLUS F/X-1/ EQUALS 0.
Technische Hogeschool, Eindhoven (Netherlands).
J. J. Beenakker. 1964, 121p

Descriptors: *Difference equation, *Differential equation, *Number theory, Difference, Differential, Equation, Green function, Laplace equation, Linear, Number, Theory.

For abstract, see STAR 05 11.
N67-22953 HC$3.00 MF$0.65

A NEW LIE SERIES METHOD FOR THE NUMERICAL INTEGRATION OF ORDINARY DIFFERENTIAL EQUATIONS, WITH AN APPLICATION TO THE RESTRICTED PROBLEM OF THREE BODIES.
National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
S. Filippi. Apr 67, 39p NASA-TN-D-3857

Descriptors: *Differential equation, *Lie group, *Numerical integration, *Three-body problem, Body, Differential, Equation, Integration, Numerical, Problem, Runge-kutta integration, Series, Three.

For abstract, see STAR 05 11.
N67-23285 HC$3.00 MF$0.65

APPLICATION OF COMPUTERS TO THE FORMULATION OF PROBLEMS IN CURVILINEAR COORDINATE SYSTEMS.
National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
For primary bibliographic entry see Field 9B.
For abstract, see STAR 05 11.
N67-23303 HC$3.00 MF$0.65

ON DISCRETE DEGENERATE REPRESENTATIONS OF THE CONFORMAL GROUP IN SPACE-TIME.
International Centre for Theoretical Physics, Trieste (Italy).
A. Maduemezia. Dec 66, 27p IC/66/113
Submitted for Publication

Descriptors: *Conformal transformation, *Group theory, *Hilbert space, *Space-time function, Algebra, Conformal, Degeneration, Dilatation, Discrete, Eigenvector, Function, Group, Harmonic function, Laplace operator, Matrix, Operator, Particle, Quantum, Representation, Space, Theory, Time, Transformation, Unitarity.

For abstract, see STAR 05 11.
N67-23387 HC$3.00 MF$0.65

FINITE RENEWAL ALGORITHMS FOR DISCRETE DYNAMIC PROGRAMMING MODELS.
Technical rept.,
Stanford Univ., Calif. Graduate School of Business.
Jeremy Frank Shapiro. Mar 67, 181p TR-20
Grant NSF-GS-552

Descriptors: (*Dynamic programming, *Statistical processes), Algorithms, Decision theory.

A study was made of three discrete dynamic programming models: the integer programming problem, a class of Markovian decision models, and a finite state space deterministic dynamic programming model. An algorithm (Renewal Algorithm I) was developed which solves the group optimization problem, and sufficient conditions for its use are given. Moreover, the algorithm was extended to Renewal Algorithm II capable of solving any integer programming problem for which the constraint matrix consists of nonnegative elements. Some asymptotic properties of the finite state and action space Markovian decision model considered by Howard and Blackwell was established. For the discounted case, a theorem was proven which states that an optimal immediate decision when the planning horizon is sufficiently large is to choose one of the decisions which is optimal when the planning horizon is infinite. An upper bound on how large is sufficiently large is given. The undiscounted case was also studied. A study was made of the finite state space deterministic dynamic programming model which is the deterministic version of the Markovian decision model. A new algorithm for finding optimal infinite horizon strategies, based on the shortest route method, was developed. Following are lemmas about the form of optimal finite horizon solutions.
PB-174 442 HC$3.00 MF$0.65

ON THE GEOMETRY OF SUBSPACES IN EUCLIDEAN n-SPACES,
Northwestern Univ., Evanston, Ill. Technological Inst.
Adi Ben-Israel. Nov 66, 22p SRM-163
Grant NSF-GP-5230
Prepared in cooperation with Illinois Univ., Chicago.

Descriptors: (*Vector spaces, Geometry), Topology, Matrix algebra, Projective geometry, Equations, Sequences.

The paper consists of four sections. In section I the intersections of manifolds in En are studied. Theorem 1 characterizes the case when an intersection of 2 manifolds is nonempby, and gives explicit expressions for that intersection. Theorems 2, 3 give the intersection of two subspaces and the projector thereon. Applications are then given for systems of equations in partitioned form (corollary 2) and for the inverses of partitioned matrices (corollaries 3,4,). Section 2 applies the results of section 1 to ill-conditioned systems of linear equations. Partitioning the equations is used to obtain a sequence of approximate solutions, for which an error bound is given. In section 3 an application is given to the generalized inverse of a product of projectors. Section 4 is independent of the rest of the paper: It extends the concept of inclination between subspaces in E (n), as introduced by Zaanenhaus. Thus it is shown that if the subspace S sub j = R (A sub j*), j=1,2, then the eigenvalues of A sub 1 A sub 2 (+) A sub 2 A sub 1 (+) are the squares of the cosines of the angles of inclination between the subspaces S sub 1, S sub 2 (theorem 4). (Author)
PB-174 504 HC$3.00 MF$0.65

ON THE NEWTON-RAPHSON METHOD.
Systems research memo.,
Northwestern Univ., Evanston, Ill. Technological Inst.
Adi Ben Israel. Sep 66, 14p SRM-162

Grant NSF-GP-5230
Prepared in cooperation with Illinois Univ., Chicago.

Descriptors: (*Numerical methods and procedures, *Least squares method), Banach space, Hilbert space, Iterative methods, Functional analysis.

The paper extends the finite-dimensional results of the Newton-Raphson methods for the solution of systems of equations and apply them to least squares problems. (Author)
PB-174 505 HC$3.00 MF$0.65

STABILIZATION POLICY IN LINEAR STOCHASTIC SYSTEMS.
Research memo.,
Princeton Univ., N. J. Econometric Research Program.
E. Philip Howrey. Sep 66, 23p RM-83
Grant NSF-GS-551

Descriptors: (*Stochastic processes, Stabilization), Linear systems, Optimization.

The paper is concerned with the description and evaluation of linear stabilization policy in linear stochastic systems. It is suggested that the power spectrum provides a useful approach to the characterization of alternative stabilization policies. For a second order autoregressive scheme, iso-frequency and iso-variance loci for the stochastic response are constructed and compared with similar loci which have been constructed for the transient response of the system. Several observations on minimum-variance policies are also included. (Author)
PB-174 506 HC$3.00 MF$0.65

INVESTIGATION OF REJECTION RULES FOR OUTLIERS IN SMALL SAMPLES FROM THE NORMAL DISTRIBUTION. IV. ESTIMATION IN THE CASE WHERE BOTH PARAMETERS ARE UNKNOWN.
Technical rept.,
Wisconsin Univ., Madison. Dept. of Statistics.
Irwin Guttman, and Dennis Smith. Oct 66, 27p TR-93
Research supported in part by NSF. See also PB-174 516.

Descriptors: (*Decision theory, *Sampling), Statistical analysis, Statistical tests, Functional analysis.

The article assumes a sample (y sub 1,...,y sub n) of n independent observations, hopefully all from N (mu, sigma to the 2nd power), but where perhaps one of the observations may be spurious, arising from either N (mu, sigma, sigma to the 2nd power) or N (mu, (1+b) sigma to the 2nd power). However, unlike the assumptions of the previous reports, the article assumes to be concerned with either, estimating mu when sigma to the 2nd power is unknown, or estimating sigma to the 2nd power when mu is unknown. (Author)
PB-174 515 HC$3.00 MF$0.65

INVESTIGATION OF REJECTION RULES FOR OUTLIERS IN SMALL SAMPLES FROM THE NORMAL DISTRIBUTION. III. ESTIMATION OF THE VARIANCE (KNOWN MEAN).
Technical rept.,
Wisconsin Univ., Madison. Dept. of Statistics.
Irwin Guttman, and Dennis Smith. Oct 66, 55p TR-92
Research supported in part by NSF. See also PB-174 517 and PB-174 515.

Descriptors: (*Decision theory, *Sampling), Analysis of variance, Functional analysis, Monte Carlo method, Statistical analysis, Statistical tests.

The report investigates the performance of rejection rules when concerned with estimating the variance sigma to the 2nd power of a normal distribution N (mu, sigma to the 2nd power) with known mean mu. We shall assume that we have a sample (y sub 1,...,y sub n) of independent observations, hopefully each y sub 1 from N (mu, sigma to the 2nd power), but where perhaps one of the observations may be spurious, arising from either N (mu + a sigma, sigma to the 2nd power) or N (mu, (1+b) sigma to the 2nd power). H (Author)
PB-174 516 HC$3.00 MF$0.65

INVESTIGATION OF REJECTION RULES FOR OUTLIERS IN SMALL SAMPLES FROM THE THE NORMAL DISTRIBUTION. II. ESTIMATION OF THE MEAN (KNOWN VARIANCE).
Technical rept.,
Wisconsin Univ., Madison. Dept. of Statistics.
Irwin Guttman, and Dennis Smith. Oct 66, 63p TR-91
See also PB-174 280 and PB-174 516. Research supported in part by NSF.

Descriptors: (*Decision theory, *Sampling), Statistical analysis, Functional analysis, Statistical tests, Analysis of variance, Monte Carlo method.

The report investigates the performance of rejection rules when concerned with estimating the mean mu of a normal distribution N (mu, sigma to the 2nd power) with known variance sigma to the 2nd power. The article assumes a sample (y sub 1,...,y sub n) of independent observations, hopefully each y sub i from N (mu, sigma to the 2nd power), but where perhaps one of the observations may be spurious, arising from either N (mu+2 sigma, sigma to the 2 power) or N (mu, (1+b) sigma to the 2nd power). (Author)
PB-174 517 HC$3.00 MF$0.65

12B. OPERATIONS RESEARCH

SOME NETWORK CHARACTERIZATIONS FOR MATHEMATICAL PROGRAMMING AND ACCOUNTING APPROACHES TO PLANNING AND CONTROL.
Carnegie Inst of Tech Pittsburgh Pa Management Sciences Research Group
For primary bibliographic entry see Field 5A.
AD-650 613 Not available from CFSTI.

INTRODUCTION TO THE THEORY AND APPLICATIONS OF THE REMAPPER.
Technion - Israel Inst of Tech Haifa Is
For primary bibliographic entry see Field 9B.
AD-650 718 HC$3.00 MF$0.65

MAINTENANCE POLICIES AND DISCIPLINES IN MULTI-CHANNEL SYSTEMS AND MARKOVIAN MULTI-SERVICE TYPE SYSTEMS.
Technical rept.,
Columbia Univ New York Operations Research Group
Israel Brosh. 1 Nov 66, 189p Rept no. TR-34
Contract Nonr-266 (55)

Descriptors: (*Queueing theory, *Operations research), (*Maintenance, *Dynamic programming), Mathematical models, Linear programming, Maintenance personnel, Machines, Probability, Decision making, Mathematical analysis.

Two types of maintenance systems are examined: (1) a multicrew system with 'preemptive priority' discipline; (2) a multi-service Markovian system with 'first come first served' discipline. In the first model, four operating characteristics are obtained for machines of priority type p: average number of machines in the system and in the line, and the corresponding waiting times. In the second model the policy structure is analyzed. A procedure is attained for choosing the optimal policy for controlling such a system. It is shown that optimal policies are of the connected type and that only in one case any one of the finite number of policies will yield the same value for the objective function.
AD-650 792 HC$3.00 MF$0.65

OPTIMAL CONTINUOUS REVIEW POLICIES FOR TWO PRODUCT INVENTORY SYSTEMS WITH JOINT SETUP COSTS.
Columbia Univ New York Operations Research Group
For primary bibliographic entry see Field 5A.
AD-650 793 HC$3.00 MF$0.65

ON RELATING NON-TECHNICAL ELEMENTS TO SYSTEM STUDIES.
Rand Corp Santa Monica Calif
For primary bibliographic entry see Field 15G.
AD-650 846 HC$3.00 MF$0.65

NETWORK PLANNING-SCANS/CPM/PERT/RAMPS. BIBLIOGRAPHY.
Netwerkplanning-scans/ert/pm/Ramps Bibliografie
Technisch Documentatie en Informatie Centrum Voor de Krijgsmacht, the Hague (Netherlands).
F. P. Van Eck. Nov 66, 62p TDCK-46624

Descriptors: *Bibliography, *Network analysis, *Pert project, Abstract, Analysis, Application, Construction, Control, Cost, Management, Network, Operation, Planning, Program, System.

For abstract, see STAR 05 11.
N67-22969 HC$3.00 MF$0.65

13. MECHANICAL, INDUSTRIAL, CIVIL, AND MARINE ENGINEERING

13A. AIR CONDITIONING, HEATING, LIGHTING, AND VENTILATING

COMPUTER PROGRAM DOCUMENTATION STEAM CONDENSER DESIGN.
Research and Development rept.,
David Taylor Model Basin Washington D C Applied Mathematics Lab
M. Botting, and D. Kelly. Jul 66, 66p
DTMB-2255

Descriptors: (*Steam condensers, Design), (*Computer programs, Steam condensers), Naval equipment, Digital computers.

The program calculates all the necessary information required for the selection of main or auxiliary steam condensers to either preliminary or contract design requirements. (Author)
AD-650 571 HC$3.00 MF$0.65

CHARACTERISTICS OF A 20-KW, LIQUID-COOLED, XENON ARC SEARCHLIGHT.
Final rept., Jul 64-Mar 66,
Army Engineer Research and Development Labs Fort Belvoir Va Night Vision Lab
Steve B. Gibson, John A. Schmidtlein, Andy J. Repasy, and Daniel J. Horowitz. Mar 67, 37p Rept no. 2

Descriptors: (*Searchlights, Performance (Engineering)), Electric arcs, Liquid cooled, Gas discharges, Xenon, Electrical properties, Thermal properties, Optical properties, Design.
Identifiers: Xenon lamps.

A searchlight was developed using a 20-kw, compact, xenon arc lamp whose electrodes were internally water cooled. The procedure consisted of modifying a housing designed for a carbon arc

lamp and mounting the xenon arc lamp coaxially. The performance of the experimental searchlight was measured, and it was found to exceed that of the carbon arc lamp searchlight in almost all desired categories. It is expected that, with future engineering and final development, this searchlight will eventually replace the carbon arc searchlight. (Author)
AD-650 881 HC$3.00 MF$0.65

WATER SUPPLY SERVICE AND SANITARY ENGINEERING.
Institute of Modern Languages Inc Washington D C
E. I. Baratov, and V. P. Chernyak. Apr 67, 11p
TT-67-61629, AERDL-T-1900-67
Contract DA-44-009-AMC-1563 (T)
Vodosnabzhenie Sabutarnaya Tekhbikaz, trans. of Vodosnabzhenie i Sanitarnaya Tekhnika (USSR), n12 p10-2 1965.

Descriptors: (*Humidity, Control systems), (*Heat transfer, Partial differential equations), USSR, Efficiency, Air conditioning equipment, Evaporation, Water, Hoists, Vehicles, Earth-handling equipment.

The article presents computations pertaining to the efficiency of humidity control of aerial water evaporation in the control cabins of hoisting, transportation and excavating machinery.
AD-650 906 HC$3.00 MF$0.65

DEVELOPMENT OF A PAVEMENT HEATING SYSTEM TO REMOVE SNOW FROM AIRPORT RUNWAY INSET LIGHTS.
Melpar Inc Falls Church Va
For primary bibliographic entry see Field 1E.
AD-650 907 HC$3.00 MF$0.65

SOME OPERATIONAL CHARACTERISTICS OF IN-PAVEMENT LIGHTING FIXTURES.
National Aviation Facilities Experimental Center Atlantic City N J
For primary bibliographic entry see Field 1E.
AD-650 962 HC$3.00 MF$0.65

PRODUCTION ENGINEERING MEASURE FOR SILICON SWITCHING TRANSISTORS.
Motorola Inc., Phoenix, Ariz. Semiconductor Products Div.
For primary bibliographic entry see Field 9A.
AD-807 416 HC$3.00 MF$0.65

FEASIBILITY STUDY OF ROTATING BOILER FOR HIGH-PERFORMANCE RANKINE CYCLE POWER GENERATION SYSTEMS.
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
For primary bibliographic entry see Field 10B.
For abstract, see STAR 05 11.
N67-23313 HC$3.00 MF$0.65

13B. CIVIL ENGINEERING

URBAN NODE IN THE INFORMATION NETWORK.
Rand Corp Santa Monica Calif
Paul Baran, and Martin Greenberger. Apr 67, 26p Rept no. P-3562
Prepared in cooperation with Sloan School of Management and Massachusetts Institute of Technology. Presented at the session on The City of Tomorrow, IEE International Convention, March 20-23, 1967, New York City. An earlier version was presented at the Engineering Foundation Research Conference on Technology and the City Matrix, August 25, 1966, Santa Barbara, California.
Availability: Available from RAND Corp., Santa Monica, Calif. $2.00.

Descriptors: (*Urban planning, Communication systems), (*Communication systems, Digital computers), Man-machine systems, Color television, Transportation, Sociology, Population, Urban areas, Commerce, Employment, Predictions.

The author considers some of the major contemporary problems of cities and asks how the fast developing technologies of computers and communications can help. The evolving role that future cities may play as nodes in national and trans-national information networks is discussed.
AD-651 109 Not available from CFSTI.

COLORS OF SIGNAL LIGHTS: THEIR SELECTION, DEFINITION, MEASUREMENT, PRODUCTION, AND USE.
National Bureau of Standards, Washington, D. C. Inst. for Basic Standards.
F. C. Breckenridge. 3 Apr 67, 61p
Hard copy available from Superintendent of Documents, GPO, Washington, D. C., 20402, $0.40.

Descriptors: (*Signal lights, Colors), Selection, Measurement, Production, Standards, Specifications, Mathematical models, Control, Psychophysics, Color vision, Distortion, Optical filters, Instrumentation.

The report is intended to serve as a reference work for all those concerned with the selection, specifications, and use of signal-light colors. It discusses the nature of the problem, and the mathematical representation, recognition, production, control, and use of such colors. The characteristics of different types of chromaticity boundaries and the purpose and effect of the requirement for similarity of chromaticity characteristics are given special consideration. The treatment is varied according to the intended use. The discussion of the control of colors and the section on the use of colors are nontechnical, whereas the section on the production of signal colors is designed for the colorimetrist who is faced with the problem of selecting limit filters or drafting a specification. (Author)
NBS-Mono-75 HC$0.40 MF$0.65

LASER ASSISTED ROCK FRACTURE.
Research rept.,
Massachusetts Inst. of Tech., Cambridge. Dept. of Civil Engineering.
F. Moavenzadeh, R. B. Williamson, and F. J. McGarry. 30 Jan 67, 63p R67-3
Contract C-85-65

Descriptors: (*Lasers, *Roads), (*Rock (Geology), Lasers), Fracture (Mechanics), Hardness, Degradation, Underground structures, Granite, Metamorphic rock.

The report presents information obtained from initial experiments involving the use of a laser to degrade and deteriorate hard rock samples. The work is being done within the context of a continuing search for more efficient means of excavation and tunnelling in hard rock. The techniques discussed herein should be considered in the context of making hard rock more easily removed by reducing its strength. The laser appears to have an unusual potential for this application. (Author)
PB-174 245 HC$3.00 MF$0.65

CONTROL AND DISPOSAL OF COTTON-GINNING WASTES.
Public Health Service, Cincinnati, Ohio. Bureau of Disease Prevention and Environmental Control.
1967, 104p PHS-Pub-999-AP-31
A Symposium sponsored by Department of Health, Education, and Welfare, and Department of Agriculture, held in Dallas, Texas, May 3-4, 1966.

Descriptors: (*Wastes (Industrial), Disposal), (*Cotton, Wastes (Industrial)), Air pollution, Dust, Particles, Defoliants, Pesticides, Textile industry, Symposia.

The symposium on the control and disposal of cotton-ginning wastes, held in Dallas, Texas, in May 1966, was jointly sponsored by the Division of Air Pollution, Public Health Service, U. S. Department of Health, Education, and Welfare, and the Agricultural Engineering Research Division, Agricultural Research Service, U. S. Department of Agriculture. The proceedings contain information on the following subjects: the roles of local, state, and Federal agencies in controlling air pollution; the roles of the state extension's gin and mechanization specialists; methods employed in harvesting cotton; operations and characteristics of the cotton gin; methods of collecting seed cotton trash; current gin trash disposal practices; methods of collecting lint cotton trash; air pollution study of cotton gins in Texas; defoliants and pesticides; trash collection and disposal system; design and operation of the in-line filter; considerations for determining acceptable ambient and source concentrations for particulates from cotton gins; and recommendations for needed research and development. (Author)
PB-174 427 HC$3.00 MF$0.65

PAVEMENT ICING WARNING SYSTEMS LABORATORY EVALUATION OF ECONOLITE AND NELSON PROTOTYPE DEVICES.
California State Div. of Highways, Materials and Research Dept.
Louis Bourget. Jan 67, 14p Rept. no. 0825
Prepared in cooperation with Bureau of Public Roads, Washington, D. C.

Descriptors: (*Pavements, *Ice formation indicators), (*Warning systems, Ice), Motor vehicle accidents, Safety devices, Roads, Hygrometers, Temperature sensitive elements, Feasibility studies.

The purpose of the study was to determine if it is feasible to use an electronic ice sensing system to activate some type of warning device. The research consisted of testing the reliability of the Econolite and Nelson systems when subjected to laboratory cycling of the temperature sensor and the moisture sensor. The Econolite System can identify dry, wet, and icing surface conditions while the Nelson System can identify only dry and icing surface conditions. Based on the results of the study, the State concluded that either system should be capable of reliable application in actual service if the sensors are placed in shaded spots most likely to freeze first and thaw last. They also concluded that the necessity of having ions in the water for moisture sensor would be no problem in the practical roadway installation because water contamination is always present at the roadway surface. (BPR abstract)
PB-174 482 HC$3.00 MF$0.65

13C. CONSTRUCTION EQUIPMENT, MATERIALS, AND SUPPLIES

DURABILITY AND BEHAVIOR OF PRESTRESSED CONCRETE BEAMS. REPORT 2. POSTTENSIONED CONCRETE INVESTIGATION PROGRESS TO JULY 1966.
Army Engineer Waterways Experiment Station Vicksburg Miss
For primary bibliographic entry see Field 13M.
AD-650 727 MF$0.65

A STUDY TO DETERMINE THE FEASIBILITY OF DEFINING EARTHMOVING VEHICLE SYSTEMS BY ANALYTICAL TECHNIQUES.
Technical rept.,
General Motors Corp Cleveland Ohio Allison Div
P. E. Jaquish, G. B. Erickson, and J. E. Jobaris.

Apr 67, 179p
Contract DA-44-009-AMC-1593 (T)

Descriptors: (*Earth-handling equipment, Systems engineering), Feasibility studies, Vehicles, Cost effectiveness, Computer programs, Design, Construction.

The feasibility of defining earthmoving vehicle systems by analytical techniques was demonstrated. The basic methodology and skeletal computer program was developed to determine the cost/effectiveness advantages of special equipment systems such as those consisting of multipurpose, multifunction vehicles. The computer program developed has verified the analytical approach by structuring a hypothetical vehicle system whose cost for performing a specific airfield construction was substantially less than the cost incurred by each of three specified engineer combat battalions. (Author)
AD-650 764 HC$3.00 MF$0.65

DEVELOPMENT OF ELECTRICAL CONDUCTING MORTARS,
Bureau of Reclamation, Denver, Colo. Concrete and Structural Branch.
For primary bibliographic entry see Field 11B.
PB-174 595 HC$3.00 MF$0.65

13D. CONTAINERS AND PACKAGING

SHIPPING DRUMS AND DRUM VENTS FOR CONCENTRATED HYDROGEN PEROXIDE.
Final rept.
Food, Machinery and Chemical Corp., Buffalo, N. Y. Becco Chemical Div.
30 Apr 54, 62p
NSRDF-Engineering-2.50593
Contract N140s-4617B

Descriptors: (*Hydrogen peroxide, *Containers), Aluminum alloys, Transportation.
AD-50 040 HC$3.00

13E. COUPLINGS, FITTINGS, FASTENERS, AND JOINTS

CORROSION RESISTANCE AND DURABILITY OF FASTENERS IN AIRCRAFT STRUCTURES.
Progress rept., Jul 65-Feb 67,
Naval Air Engineering Center Philadelphia Pa Aeronautical Materials Lab
Joseph Viglione, and Irving S. Shaffer. 26 Jan 67, 44p Rept no. NAEC-AML-2529

Descriptors: (*Mechanical fasteners, Corrosion resistance), Airframes, Corrosion, Fatigue (Mechanics), Screws, Aluminum alloys, Corrosion inhibition, Metal joints, Steel, Sealing compounds, Salt spray tests, Performance (Engineering).
Identifiers: Aluminum alloy 7075.

A corrosion and fatigue evaluation was made to determine whether the rounding of countersunk holes and/or fastener heads would improve the corrosion behavior at the fastener locations or affect the fatigue strength of 7075-T6 aluminum alloy joints assembled with cadmium plated steel countersunk head screws. Test assemblies were prepared with and without corrosion barrier materials, including a MIL-S-8802 polysulfide sealant, in the finishing system. Rounded configurations did not significantly improve corrosion behavior but did improve the fatigue strength of the specimens. The greatest improvement in fatigue properties occurred with a combination of rounded fastener heads and rounded countersunk holes. Of the various corrosion barrier materials tested, only the polysulfide sealant afforded good corrosion protection when used with a paint system overcoat. However, the use of the sealant more than negated the beneficial effect of the rounded configurations on fatigue strength. The use of the sealant lowered the fatigue strength of the control specimens with standard fastener heads and standard countersunk holes by approximately 6%. This loss is counterbalanced by the improvement in corrosion behavior afforded by the sealant to fastener areas. (Author)
AD-651 189 HC$3.00 MF$0.65

13F. GROUND TRANSPORTATION EQUIPMENT

EVALUATION OF VEHICLE CORROSION PREVENTIVES.
Army Weapons Command, Rock Island, Ill. Research and Engineering Div.
For primary bibliographic entry see Field 13H.
AD-476 493 HC$3.00 MF$0.65

DYNAMICS OF FLEXIBLY SUPPORTED TUNNELS AND OTHER ROADBEDS,
Massachusetts Inst. of Tech., Cambridge. Engineering Projects Lab.
For primary bibliographic entry see Field 13M.
PB-173 645 HC$3.00 MF$0.65

SUPPLEMENT TO SURVEY OF TECHNOLOGY IN FLUID SUSPENSIONS: PATENT SEARCH AND EFFECTS OF FORWARD SPEED,
Massachusetts Inst. of Tech., Cambridge. Engineering Projects Lab.
H. H. Richardson, and W. A. Ribich. 1 Nov 66, 68p DSR-76110-1
Contract C-85-65
See also PB-168 648.

Descriptors: (*Fluid mechanics, Cargo vehicles), Velocity, Patents, Experimental design, Models (Simulations), Towed vehicles, Railroad cars, Diagrams, Tables.

Supplementary information to that given in Part I, Survey of Technology for High Speed Ground Transport, Ref. 1, is presented for fluid suspensions and fluid-supported vehicle systems. Representative patent literature is described which shows that the existing basic concepts and configurations for fluid suspensions and associated vehicles are very old; however, many recent patents have been issued covering variations, improvements and applications to transport vehicles. Published information and experimental facilities and techniques relative to the influence of forward speeds less than 150 mph, to ambient pressures of one atmosphere and to low cushion-pressure levels. An adequate theoretical approach to forward speed effects is lacking. No experimental facilities entirely satisfactory for the investigation of the behavior of dynamically similar scale models of HSGT vehicles and guideways were found to exist in the world. (Author)
PB-173 653 HC$3.00 MF$0.65

ELECTRO-MAGNETIC FRICTION BRAKE SYSTEM.
Final rept.,
Warner Electric Brake and Clutch Co., Beloit, Wis.
R. Brendemuehl, R. Braukhoff, and L. Mihalick.28 Feb 67, 47p
Prepared in cooperation with San Francisco Bay Area Rapid Transit District Test Track Program, and Parsons Brinckerhoff-Tudor-Bechtel.

Descriptors: (*Electric brakes, *Design), (*Railroads, *Brakes), Railroad tracks, Friction, Electromagnetic properties, Control systems, Railroad cars, Diagrams, Tests, San Francisco Bay, California.

The report will discuss the design, development, and demonstration phases of an automatically controlled multiple disc friction brake system having high heat dissipation capacity, installed on laboratory car 'A' at the San Francisco Bay Area Rapid Transit District (BARTD) Diablo test facility in Concor, California. (Author)
PB-174 426 HC$3.00 MF$0.65

THE REMOVAL AND UTILIZATION OF JUNKED AUTOMOBILES IN EASTERN KENTUCKY.
Final rept.,
Battelle Memorial Inst., Columbus, Ohio. Columbus Labs.
E. J. Jablonowski, M. G. Roth, and R. W. Hale.-
Mar 67, 101p
Prepared in cooperation with Economic Development Administration, Washington, D. C.

Descriptors: (*Metals, Passenger vehicles), (*Salvage, Metals), Structural parts, Removal, Tin, Industries, Costs, Iron compounds, Safety, Reclamation, Kentucky.

The inventory of junked autos has swollen to the point of blighting the countryside. Safety and health hazards associated with junked autos and the conservation/utilization of the scrap metal value of a junker provide ample reason for developing remedial disposal plans. The study considers a portion of the national junk-automobile problem. It is restricted to 36 counties in the Appalachian Region of Eastern Kentucky and related to junkers abandoned on or near public roads and junkers located in small and remote yards. Graveyards and auto-wrecking yards containing large numbers of automobiles were not considered. The primary objective of the study was the development of a junk-automobile-removal program. (Author)
PB-174 464 HC$3.00 MF$0.65

THE RELATIONSHIP BETWEEN THE DENSITY AND OCCUPANCY CONCEPTS,
National Proving Ground for Freeway Surveillance, Control and Electronic Traffic Aids, Detroit, Mich.
Gordon F. Paesani. Nov 66, 17p Rept. no. 0779
Prepared in cooperation with Bureau of Public Roads, Washington, D. C.

Descriptors: (*Passenger vehicles, *Traffic), (*Mathematical analysis, Traffic), Roads, Electronic recording systems, Velocity, Mathematical logic.

The report refines and verifies the relationship between point density and occupancy by taking into consideration the greater road requirement of trucks. The latter is shown to be of greater importance as the ratio of trucks to total vehicles increases. (Author)
PB-174 481 HC$3.00 MF$0.65

D.C. CHOPPER CONTROL - TRANSIENT GENERATION STUDY OF BARTD,
Westinghouse Electric Corp., Pittsburgh, Pa.
J. W. Skooglund.Jan 67, 28p Rept. no. 67-594
Prepared in cooperation with Dept. of Housing and Urban Development.

Descriptors: (*Railroad tracks, *Voltage), (*Mathematical analysis, Correlation techniques), Circuits, Bandwidth, Frequency, Electric filters, Performance (Engineering), San Francisco Bay, California.

The report describes an analytical study of the transient voltages produced by d.c. chopper control on the Bay Area Rapid Transit District System. This study was performed by Westinghouse for Parsons-Brinckerhoff-Tudor-Bechtel in cooperation with BARTD. (Author)
PB-174 520 HC$3.00 MF$0.65

ROCKWELL TRUCK DEVELOPMENT FOR BAY AREA RAPID TRANSIT DISTRICT.
Final rept.
Rockwell Mfg. Co., Atchison, Kans. LFM-Atchison Div.
Jan 67, 101p
Contract Z-425
Research supported in part by Department of Housing and Urban Development, Washington, D. C.

Descriptors: (*Railroad cars, *Vehicle chassis components), Design, Suspension devices, Vehicle wheels, Structural parts, Stresses, Load distribution, Performance (Engineering), Reliability, Maintenance, Diagrams, Data, San Francisco Bay, California.

Contents: Design objectives of the Rockwell BARTD truck assembly fan, Bay area Rapid transit district, San Francisco, California; Truck description; Test summary; Vertical suspension; Lateral suspension; Maintenance of tram; Test of structural components; Assembly data; Ride performance test. (Author)
PB-174 536 HC$3.00 MF$0.65

TEST REPORT ON GENERAL 70-E TRUCKS APPLIED TO: SAN FRANCISCO BAY AREA RAPID TRANSIT LABORATORY CAR 'C' - SERIES I,
General Steel Industries, Inc., Granite City, Ill. Castings Div.
W. E. Burdick. 28 Oct 66, 83p
Contract Z-404
Research supported in part by Department of Housing and Urban Development, Washington, D. C. Report on proj. Performance of the General 70-E Truck for Bart.

Descriptors: (*Railroad cars, *Vehicle chassis components), Railroads, Vehicle wheels, Captive tests, Vehicle tracks, Diagrams, Tables, Tests, San Francisco Bay, California.

The General 70-E trucks have undergone a full year of testing on the BARTD test track at Concord, California. Approximately 15,000 miles of service were accumulated under both manual and automatic train control operation under BARTD Laboratory Car C. Investigations into performance and riding characteristics were conducted by GSI during these operations. Certain truck design alternatives were evaluated and much useful data were accumulated, which is reported herein. The riding qualities were found to be well within accepted comfort limits, under operating conditions of full power on both tangent track and main line curves. Static tests, consisting of measurement of equalization of wheel loads and tilt of car standing on superelevated curves, were conducted with very satisfactory results. Although the General 70-E truck for BARTD is the first of its kind, the test program disclosed no changes to the basic design would be required in a production version. However, the laboratory truck included certain features to increase its versatility in the test program, which would not be required in a production version; consequently the production version would weigh approximately 1,000 pounds less, using same type components. (Author)
PB-174 537 HC$3.00 MF$0.65

PHASE V - FIELD TESTING AND TRUCK CONTRACT Z-401.
Final rept.,
Budd Co., Philadelphia, Pa.
B. Labaree. Jun 66, 88p PR-281-28
Contract Z401
Research sponsored in part by a grant from the Department of Housing and Urban Development.

Descriptors: (*Passenger vehicles, *Design), Pneumatic brakes, Weight, Vehicle chassis components, Performance (Engineering), Reliability, Suspension devices, Adhesion, Axle shafts, Vehicle tracks, Tests.

The principal objective of this contract was to design and develop an advanced lightweight truck that would result in significantly superior ride and operation for the BARTD system. A second objective was to find and coordinate an electropneumatic friction brake system that would be compatible with the Z401 truck and dynamic brake which would achieve the highest possible advance in rapid transit braking for BARTD automatic operation. The test program on the Diablo Test Track from November 1965 to June 1966 proved that the Z401 truck and 'Westcode' brake system developed under this contract and installed under Laboratory Car A2 met or exceeded everyone of the contract objectives: riding qualities, lightweight, failsafe, performance, consistency, simplicity and reliability. Rail-wheel adhesion values attained on wet track exceeded the most optimistic predictions. (Author)
PB-174 538 HC$3.00 MF$0.65

TESTS CONDUCTED ON THE WABCO TRANSIT TRUCK.
Final rept.
LeTourneau-Westinghouse Co., Peoria, Ill.
Jul 66, 164p
Contract Z402
Research sponsored in part by Dept. of Housing and Urban Development.

Descriptors: (*Passenger vehicles, *Design), Vehicle chassis components, Costs, Vehicle wheels, Noise, Suspension devices, Oscillation, Torque, Gears, Tests, California.

In the concepting of the WABCO Rapid Transit Truck, we believed that improvements could be made which would be beneficial to the commuters using the system, as well as to the Bay Area Rapid Transit District in the form of reduced operating costs. These concepts consisted of providing a truck design which would give the passenger a good ride through the use of the HYDRAIR (R) suspension and truck components which would reduce wheel and rail wear, reduce noise level and reduce nosing or oscillation of the truck about the centerpin through the use of a torque proportioning differential and wheel tread shape. (Author)
PB-174 539 HC$3.00 MF$0.65

ROAD TEST OF PULLMAN-STANDARD TRUCKS ON SFBARTD TEST TRACT.
Pullman, Inc., Chicago, Ill. Pullman-Standard Div.
T. R. Schmitz, W. R. Shaver, and W. P. Manos. Dec 66, 56p
Prepared in cooperation with the Department of Housing and Urban Development.

Descriptors: (*Vehicle chassis components, *Railroad cars), Tests, Performance (Engineering), Springs, Suspension devices.

The concept of a centerplateless truck of the Pullman-Standard configuration is sound. Under the full range of operating conditions experienced at the Mt. Diablo test track, general truck behavior was good. No sustained harmonic oscillations or other erratic truck action were noted. Vehicle ride quality was quite acceptable for any of the several suspension systems tested. Under the final arrangement, which was presented to P-B-T-B for their evaluation tests, ride quality was judged to be excellent. Truck frame reaction to loads experienced during road test tends to agree with design expectations. Stress levels were moderate. Based on extrapolation of stress data to correspond to maximum passenger service loads, the truck frames are structurally adequate. There are areas of understressed material and points of stress concentration which suggest minor structural change. For this aluminum frame, the effect of such modifications is expected to be a net weight reduction. The comprehensive load and stress data gathered during these road tests should be useful for engineering design refinements. (Author)
PB-174 542 HC$3.00 MF$0.65

13G. HYDRAULIC AND PNEUMATIC EQUIPMENT

NOTE ON THE CONCEPT OF BLUNT TRAILING EDGE BLADES,
Von Karman Inst for Fluid Dynamics Rhode-Saint-Genese (Belgium)
For primary bibliographic entry see Field 20D.
AD-650 606 HC$3.00 MF$0.65

DEVELOPMENT OF DIGITAL COMPUTER PROGRAM FOR STEAM-DRIVEN FREE-PISTON AIR COMPRESSOR.
Navy Marine Engineering Lab Annapolis Md
For primary bibliographic entry see Field 9B.
AD-650 959 HC$3.00 MF$0.65

A STUDY OF A CORONA WIND DIGITAL FLUID AMPLIFIER ELEMENT.
Technical rept.,
Ohio State Univ Research Foundation Columbus
H. R. Velkoff, and James Bishop. Mar 67, 88p
Rept no. TR-3
AROD-4942:3-E
Contract DA-31-124-ARO (D)-246
Master Thesis.

Descriptors: (*Fluid amplifiers, Digital systems), Electrical corona, Voltage, Gas flow, Transducers, Miniature electrical equipment, Electric currents, Nozzles.

An experimental investigation was conducted on the use of corona wind in air as a means of triggering a fluid 'flip-flow' amplifier element. The study centered on the ability to miniaturize the device. Specific emphasis was also given to the nature of the connecting lines and plenum for the lateral control ports. The results of the investigation indicated that the miniaturized units required very small currents to flip the primary jet, and that the units were very sensitive to the configuration of the plenum and lateral lines. (Author)
AD-651 166 HC$3.00 MF$0.65

A COMPARISON OF FLUID DIODES.
British Hydromechanics Research Association, Cranfield (England).
P. J. Baker. 1967, 28p
Presented At the 2d Cranfield Fluidics Conf., Cambridge, England 3-5 Jan. 1967 Sponsored By United Kingdom Atomic Energy Authority Its Paper D6

Descriptors: *Diode, *Fluidics, *Performance characteristics, Characteristics, Comparison, Conference, Drop, Flow, Fluid, Forward, Geometry, Operation, Performance, Pressure, Ratio, Rectifier, Reverse, Vortex.

For abstract, see STAR 05 11.
N67-23071 HC$3.00 MF$0.65

CHARACTERISTICS OF VORTEX DEVICES.
Sheffield Univ. (England).
M. A. Hassan, and J. K. Royle. 1967, 16p
Presented At the 2d Cranfield Fluidics Conf., Cambridge, Eng, 3-5 Jan. 1967 Its Paper D4

Descriptors: *Fluid amplifier, *Sink, *Vortex flow, Amplifier, Axisymmetry, Characteristic, Coanda effect, Compressible, Conference, Dimensional, Flow, Fluid, Impedance, Incompressible, Jet, Nozzle, Pitot, Pressure, Switch, Tube, Two, Unsteady, Vortex.

For abstract, see STAR 05 11.
N67-23079 HC$3.00 MF$0.65

A FLUIDIC DIGITAL DISPLACEMENT INDICATOR.
British Aircraft Corp., Stevenage (England).
G. C. Gant. 1967. 12p
Presented At the 2d Cranfield Fluidics Conf., Cambridge, England, 3-5 Jan. 1967 Its Paper E1

Descriptors: *Digital transducer, *Displacement, *Fluidics, *Logic circuit, *Position indicator, Back, Coding, Cutting, Design, Digital, Indicator, Manufacture, Nozzle, Position, Pressure, Rectilinear, System, Testing, Tool, Transducer.

For abstract, see STAR 05 11.
N67-23080 HC$3.00 MF$0.65

HYDRAULIC AXISYMMETRIC FOCUSED-JET DIVERTERS WITH PNEUMATIC CONTROL.
National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
F. R. Goldschmied, and M. A. Kalange. 15 Dec 66, 31p NASA-TM-X-53554

Descriptors: *Digital technique, *Fluid amplifier, *Pneumatic control, Amplifier, Axisymmetry, Control, Digital, Dynamics, Flow, Fluid, Fluidics, Focus, Hydraulic, Jet, Mechanics, Pneumatic, Power, Pressure, System, Technique.

For abstract, see STAR 05 11.
N67-23332 HC$3.00 MF$0.65

13H. INDUSTRIAL PROCESSES

EVALUATION OF VEHICLE CORROSION PREVENTIVES.
Final technical rept.,
Army Weapons Command, Rock Island, Ill. Research and Engineering Div.
Harry C. Muffley. Dec 65, 37p
RIA-65-3305

Descriptors: (*Vehicles, *Corrosion inhibition), Corrosion, Test methods, Chemical compounds, Coatings, Wear resistance, Spray tanks, Corrosion resistance.

Thirty one commercially available vehicle corrosion preventives were evaluated in the laboratory in order to establish requirements and test methods to define a satisfactory material for preserving vehicles. Seven compounds that showed promise as a result of laboratory tests were field tested. The field test indicated that certain types of materials will provide adequate protection for extended periods of time. The materials showed varying degrees of abrasion resistance in the wheel wells. This was not considered serious as periodic touch up of these areas could be accomplished on a routine maintenance basis. Based on this work a purchase description was written describing an acceptable compound. Three materials evaluated met the requirements of the purchase description. A companion document defining the spray equipment used was also prepared. These documents will serve as a guide for the user in obtaining the proper preservative, instructions on how to clean the vehicle, the method of application and the proper type of spray equipment for use on an individual basis. (Author)
AD-476 493 HC$3.00 MF$0.65

DENTAL MATERIALS.
Michigan Univ Ann Arbor School of Dentistry
For primary bibliographic entry see Field 6E.
AD-650 583 HC$3.00 MF$0.65

EVALUATION OF SILICIDE COATINGS ON COLUMBIUM AND TANTALUM AND A MEANS FOR IMPROVING THEIR OXIDATION RESISTANCE,
Lockheed Missiles and Space Co Palo Alto Calif
Lockheed Palo Alto Research Lab
For primary bibliographic entry see Field 11C.
AD-650 675 Not available from CFSTI.

LITERATURE SURVEY ON DIRECT ENERGY MACHINING,
Watertown Arsenal Mass
Charles R. Hyland. Jan 64, 26p Rept no. Survey Ind-1/64

Descriptors: (*Machining, Reviews), Electroerosive machining, Spark machining, Ultrasonic radiation, Energy, Hardness, Grinding.

The mechanism of various direct energy machining processes is presented. Machine requirements are discussed. Direct energy machining processes, at the present state of the art, are a breakthrough to the solution of shaping of materials which cannot be machined economically using edged cutting tools. Direct energy machining processes are a solution to the impracticability of hand working holes and geometrical configurations which cannot be formed with rotating or reciprocating edged tools. Direct energy machining is a solution to the problem of machining without distortion. Material hardness is an insignificant factor in direct energy machining. Technological advances in machine construction have elevated direct energy machining to production capacity.
AD-650 692 HC$3.00 MF$0.65

A DUSTLESS FACTORY, A SPECIAL ENVIRONMENTAL REQUIREMENT IN THE MANUFACTURE OF PRECISION GYROSCOPES,
Foreign Technology Div Wright-Patterson AFB Ohio
Ming Wu. 25 Jan 67, 12p Rept no. FTD-HT-66-412
TT-67-61593
Edited trans. of Hang K'ung Chih Shih (Chinese People's Republic) v2 n7 p8-10 1965.

Descriptors: (*Industrial plants, Clean rooms), (*Gyroscopes, Manufacturing methods), China, Dust.

The article reviews the manufacture, testing, design, and employment of gyroscopes in high-speed aircraft and the ICBM. (Author)
AD-650 745 HC$3.00 MF$0.65

FABRICATION OF DENSE FINE GRAINED CERAMIC MATERIALS.
Manlabs Inc Cambridge Mass
For primary bibliographic entry see Field 11B.
AD-650 883 HC$3.00 MF$0.65

ELECTRON-MICROSCOPE INVESTIGATION OF THE SYSTEM OF ALLOYS Al-Zn-Mg,
Institute of Modern Languages Inc Washington D C
For primary bibliographic entry see Field 11F.
AD-650 909 HC$3.00 MF$0.65

CHEMICAL VAPOR DEPOSITED MATERIALS FOR ELECTRON TUBES.
Quarterly rept. no. 7, 15 Nov 66-14 Feb 67,
Raytheon Co Waltham Mass Research Div 2204
S. R. Steele, J. Pappis, H. Schilling, and L. Hagen. Apr 67, 57p Rept no. S-936
ECOM-01343-7
Contract DA-28-043-AMC-01343 (E)

Descriptors: (*Vapor plating, *Electron tubes), Heat-resistant materials, Electron tube parts, Deposition, Chemical precipitation, Carbides, Nitrides, Microwaves, Borides, Thermionic emission, Coatings.

The program was established to investigate chemical vapor deposition as a method of producing materials or coatings for use in vacuum electron devices and microwave tubes. Isotropic CVD-BN has been deposited on W-RE wire for use as an encapsulated heater. The wire was brittle after deposition, but the coating was intact and exhibited good heat transfer capability. Multilayered structures of ZrB2 and isotropic CVD Bn have been deposited in a solenoid-controlled vapor deposition setup. The correct process conditions have been determined to achieve good layer adherence and uniformly thick layers of the proper thickness in 1in. pipe mandrels. The investigation of sealing methods for joining CVD BN to glasses and metals has been continued. The active metal process is promising for isotropic BN-to-metal seals, as is a metallizing mixture of 70% Mo, 21% Ni, and 9% Ti fired in vacuum. Seals to glass have been obtained with a silicon resin and with solder glass. Recommendations are made for procedures for cleaning and machining CVD BN. The optical transmission of several samples of isotropic CVD BN has been measured as a function of wavelength between 0.4 and 15 microns. In all samples strong absorptions are obtained between 7 to 8 microns and 12 to 13 microns. The largest differences from sample to sample are seen at 0.9 microns, and the strongest absorption at this wavelength is seen in a sample identified by X-ray diffraction as mostly rhombohedral BN. Optical absorption at 0.9 microns, coupled with physical density, seems to be a good measure of the quality of isotropic CVD BN for most electron device applications. (Author)
AD-651 021 HC$3.00 MF$0.65

STUDIES OF CERAMIC PROCESSING.
Rutgers - the State Univ New Brunswick N J School of Ceramics
For primary bibliographic entry see Field 11B.
AD-651 061 HC$3.00 MF$0.65

MATTING OF ALUMINUM AND ITS ALLOYS,
Foreign Technology Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 11C.
AD-651 088 HC$3.00 MF$0.65

CORROSION RESISTANCE AND DURABILITY OF FASTENERS IN AIRCRAFT STRUCTURES.
Naval Air Engineering Center Philadelphia Pa Aeronautical Materials Lab
For primary bibliographic entry see Field 13E.
AD-651 189 HC$3.00 MF$0.65

METALLIC-CERAMIC AND INTERMETALLIC COMPOUNDS BY THE FLOATING ZONE TECHNIQUE.
Progress rept. no. 1, 1 Oct 65-30 Sep 66,
Naval Air Engineering Center Philadelphia Pa Aeronautical Materials Lab
Marshall K. Thomas, Jr. 6 Mar 67, 23p Rept no. NAEC-AML-2559

Descriptors: (*Zone melting, Refractory materials), (*Cermets, Zone melting), (*Intermetallic compounds, Zone melting), Niobium, Aluminum compounds, Oxides, Alumina, Nickel alloys, Aluminum alloys.

The use of the floating zone process for the preparation of refractory materials is discussed. This process has been used to prepare columbium-aluminum oxide cermets and the intermetallic compound nickel aluminide (NiAl). Small amounts of aluminum oxide harden columbium and higher concentrations of aluminum oxide form a series of metallic and non-metallic phases. Zone melting a nickel tube with an aluminum rod inside it has resulted in a small amount of what appears to be NiAl. (Author)
AD-651 191 HC$3.00 MF$0.65

THE PILOT PRODUCTION AND EVALUATION OF CHROMIUM ALLOY SHEET AND PLATE FINAL REPORT.
General Electric Co., Cleveland, Ohio. Lamp Metals and Components Dept.
For primary bibliographic entry see Field 11F.
For abstract, see STAR 05 11.
N67-22175 HC$3.00 MF$0.65

WELDED TRANSITION JOINTS OF 9 CR-1 MO ALLOY STEEL/316SS FOR SHORT LIFE (100 HOURS MAXIMUM) APPLICATION.
Aerojet-general Corp., Azusa, Calif.
R. A. Mendelson. 27 Feb 64, 24p NASA-CR-72205, TM-390-63-4-172

Descriptors: *Chromium alloy, *Molybdenum alloy, *Stainless steel, *Welding, Aging, Alloy, Characteristics, Chromium, Cycle, High temperature, Joint, Molybdenum, Parameter, Stainless, Steel, Strength, Testing, Transition.

For abstract, see STAR 05 11.
N67-22841 HC$3.00 MF$0.65

PRELIMINARY EXAMINATION OF PROTOTYPE REFRACTORY BIMETALLIC TUBING FROM NUCLEAR METALS, INCORPORATED.
Aerojet-general Corp., Azusa, Calif.
C. A. Landusky. 27 Jan 64, 11p NASA-CR-72202, TM-390-64-4-199

Descriptors: *Metal-metal bonding, *Tubing, *Ultrasonic testing, Bonding, Control, Inspection, Metal, Quality, Testing, Ultrasonic.

For abstract, see STAR 05 11.
N67-22891 HC$3.00 MF$0.65

MACHINERY AND TOOLS USED IN THE MANUFACTURE OF ELECTRONIC PARTS AND COMPONENTS IN THE FEDERAL REPUBLIC OF WEST GERMANY.
Fry Consultants, Inc., Frankfurt am Main (West Germany).
Sep 65, 79p
Rept. on Foreign Market Survey. Prepared in cooperation with Business and Defense Services Administration, Washington, D. C.

Descriptors: (*Manufacturing methods, *Electronic equipment), Machine tool industry, Electron tubes, Test equipment (Electronics), Industrial equipment, Commerce, Industrial production, West Germany.

Contents: The Market Potential for American Products; General Marketing Information; Germany; The Electronics Industry; Machinery and Tools for Producing Parts and Components; Structure of the Market; How the Electronics Manufacturer Obtains Machinery; Selling Techniques; The Purchase Decision; Competitive Factors - Tariffs; The Image of American Products. (Author)
PB-174 551 HC$3.00 MF$0.65

LOW-ENERGY ACCELERATED ION DEPOSITION,
Dow Chemical Co., Golden, Colo. Rocky Flats Div.
For primary bibliographic entry see Field 20H.
For abstract, see NSA 21 09.
RFP-686 HC$3.00 MF$0.65

CLEANING AN IDEAL BERYLLIUM SURFACE,
Dow Chemical Co., Golden, Colo. Rocky Flats Div.
For primary bibliographic entry see Field 7B.
For abstract, see NSA 21 09.
RFP-879 HC$3.00 MF$0.65

13I. MACHINERY AND TOOLS

THE DEVELOPMENT OF GAS LUBRICATED BEARINGS FOR USE IN BLOWER AND FAN MOTORS. PART II.
Final development rept., 7 Jun 62-7 Jun 63.
Rotron Mfg., Co., Woodstock, N. Y.
25 Jun 63, 148p
Contract NOOsr-87522

Descriptors: (*Gas bearings, Lubrication), Handbooks, Journal bearings, Thrust bearings, Blowers, Design, Tables, Test methods, Loading (Mechanics), Pressure, Air, Films, Dynamics, Compressive properties, Friction, Equations, Vibration, Velocity, Stability.
Identifiers: Hydrodynamic bearing.

Use of the gas bearing design manual review of basic concepts in gas lubricated bearings; design of gas lubricated journal bearings; load-carrying capacity with static, unidirectional loads; evaluation of friction in full journal bearings; attitude angle in full gas-lubricated journal bearings; synchronous whirl; half-frequency whirl; self-acting thrust bearings; design of self-acting, spiral grooved thrust bearings; bearing loads; magnetic radial bearing loads; bearing moment loads. (Author)
AD-413 027 HC$3.00

VIBRATION ISOLATION WHEN MACHINE AND FOUNDATION ARE RESILIENT AND WAVE EFFECTS OCCUR IN THE MOUNTS.
Research and development rept.,
David Taylor Model Basin Washington D C Hydromechanics Lab
Alan O. Sykes. Sep 60, 110p
DTMB-1404

Descriptors: (*Vibration isolators, Effectiveness), Damping, Machines, Foundations (Structures), Rubber, Helical springs, Mathematical prediction.

The problems of estimating the effectiveness of isolation mounts in reducing vibration are discussed. Massless spring-dashpot mounts, arbitrary two-terminal mounts having mass as well as stiffness and damping, and a special case of this second type, the continuous mount, are all treated. Curves, data, and formulas are presented for estimating the characteristics and effectiveness of both rubber and helical spring mounts. (Author)
AD-650 586 HC$3.00 MF$0.65

FLUID CONTAMINATION IN TRAIN AND EVALUATION POWER DRIVES.
Franklin Inst Research Labs Philadelphia Pa
For primary bibliographic entry see Field 11H.
AD-650 632 HC$3.00 MF$0.65

ROLLER STABILITY USING NEW SYNTHETIC LUBRICANTS,
Foreign Technology Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 11H.
AD-650 743 HC$3.00 MF$0.65

NEWS IN MACHINE LUBRICANTS (CHAPTER IV AND V),
Foreign Technology Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 11H.
AD-650 806 HC$3.00 MF$0.65

OPERATION OF HYDRODYNAMIC JOURNAL BEARINGS IN SODIUM AT TEMPERATURES TO 800 DEG F AND SPEEDS TO 12000 RPM.
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
W. J. Anderson, Z. Nemeth, and F. T. Schuller. Apr 67, 31p NASA-TN-D-3928
Contract 120-27-04-03-22

Descriptors: *Journal bearing, *Liquid sodium, *Material testing, *Stability test, *Wear, Bearing, Carbide, Compatibility, Equipment, Hastelloy, High speed, High temperature, Inconel, Instability, Journal, Liquid, Material, Method, Molybdenum, Operation, Satellite, Seizure, Sodium, Stability, Test, Testing, Titanium.

For abstract, see STAR 05 11.
N67-23301 HC$3.00 MF$0.65

STEADY-STATE AND DYNAMIC PROPERTIES OF JOURNAL BEARINGS IN LAMINAR FLOW REGIMES. I. TILTING-PAD BEARINGS.
Mechanical Technology, Inc., Latham, N. Y.
F. K. Orcutt. Apr 67, 112p NASA-CR-732
Contract NASW-1021

Descriptors: *Dynamic property, *Journal bearing, *Laminar flow, *Static loading, *Turbulent flow, Bearing, Capacity, Coefficient, Damping, Dynamic, Film, Flow, Friction, Journal, Laminar, Loading, Pad, Performance, Property, Stability, State, Static, Steady, Stiffness, Tilting, Torque, Turbulent.

For abstract, see STAR 05 11.
N67-23305 HC$3.00 MF$0.65

STUDIES OF ROLLING-ELEMENT LUBRICATION AND FATIGUE LIFE IN A REDUCED PRESSURE ENVIRONMENT.
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
R. J. Parker, D. W. Reichard, and E. V. Zaretsky. 1967, 20p NASA-TM-X-52287
Presented At the Ann. Meeting of the Am. Soc. of Lubrication Engr., Toronto, 1-4 May 1967

Descriptors: *Fatigue life, *Lubrication, *Pressure effect, *Rolling contact bearing, Atmospheric, Bearing, Contact, Effect, Elastohydrodynamics, Ether, Fatigue, Life, Low, Lubricant, Machine, Mineral, Oil, Polyphenyl, Pressure, Rolling, Test, Wear.

For abstract, see STAR 05 11.
N67-23311 HC$3.00 MF$0.65

HYDRODYNAMIC JOURNAL BEARING PROGRAM QUARTERLY PROGRESS REPORT, 29 APR. - 29 JUL. 1966.
General Electric Co., Cincinnati, Ohio. Missile and Space Div.
W. H. Bennethum, H. E. Nichols, W. D. Richards, and R. J. Rossbach. 29 Jul 66, 96p NASA-CR-72160, QPR-5
Contract NAS3-6479

Descriptors: *Hydrodynamics, *Instrumentation program, *Journal bearing, *Power supply, Bearing, Displacement, Instrumentation, Journal, Nasa program, Probe, Program, Scanning, Sensor, Transducer.

For abstract, see STAR 05 11.
N67-23330 HC$3.00 MF$0.65

STRESS AND STRAIN IN ROLLING BODIES IN CONTACT,
Massachusetts Inst. of Tech., Cambridge. Engineering Projects Lab.
For primary bibliographic entry see Field 20K.
PB-173 651 HC$3.00 MF$0.65

EQUIPMENT FOR THE PULP AND PAPER INDUSTRY IN SWEDEN.
Squires (C. K.), Inc., Stockholm (Sweden).
For primary bibliographic entry see Field 5C.
PB-174 546 HC$3.00 MF$0.65

POWER HAND TOOLS IN JAPAN.
Adams (T. F. M.) and Co., Inc., Tokyo (Japan).
For primary bibliographic entry see Field 5C.
PB-174 547 HC$3.00 MF$0.65

MACHINERY, COMPONENTS AND ACCESSORIES FOR PULP AND PAPER PRODUCTION AND PAPER CONVERTING IN THE FEDERAL REPUBLIC OF WEST GERMANY.
Fry (George) and Associates, Inc., Frankfurt am Main (West Germany).
For primary bibliographic entry see Field 5C.
PB-174 550 HC$3.00 MF$0.65

MACHINERY AND TOOLS USED IN THE MANUFACTURE OF ELECTRONIC PARTS AND COMPONENTS IN THE FEDERAL REPUBLIC OF WEST GERMANY.
Fry Consultants, Inc., Frankfurt am Maim (West Germany).
For primary bibliographic entry see Field 13H.
PB-174 551 HC$3.00 MF$0.65

WELDING EQUIPMENT AND MATERIALS IN THE UNITED KINGDOM.
Barclay (B. H.), Product Sales Analysis Ltd., London (England).
For primary bibliographic entry see Field 5C.
PB-174 552 HC$3.00 MF$0.65

PRINTING AND BINDERY EQUIPMENT IN ITALY.
Oliver-Beckman Italiana S.r.l., Rome (Italy).
For primary bibliographic entry see Field 5C.
PB-174 555 HC$3.00 MF$0.65

13J. MARINE ENGINEERING

STRESSES IN A PHOTOELASTIC MODEL OF THE ORIGINAL DESIGN OF A BOTTOM LONGITUDINAL CONNECTION IN T-2 TANKERS.
Research and development rept.,
David Taylor Model Basin Washington D C Structural Mechanics Lab
Joseph S. Brock, and Mary C. Crook. Aug 60, 17p
DTMB-1445

Descriptors: (*Tankers, Structural properties), (*Ship models, Stresses), Photoelasticity, Design, Model tests, Reliability, Failure (Mechanics), Steel.

A photoelastic model of the original bottom longitudinal connection in T-2 tankers was tested to determine the reliability of photoelastic techniques in evaluating complex structural designs. The highest stress concentration in the model occurred at the location of failure in a steel model of the same design. Also stress concentrations in this design, which failed in service, were higher than those in a photoelastic model of the modified connection. (Author)
AD-650 569 HC$3.00 MF$0.65

COMPUTER PROGRAM DOCUMENTATION STEAM CONDENSER DESIGN.
David Taylor Model Basin Washington D C Applied Mathematics Lab
For primary bibliographic entry see Field 13A.
AD-650 571 HC$3.00 MF$0.65

GRAPHICAL METHODS FOR DETERMINING THE PLASTIC SHELL-BUCKLING PRESSURES OF RING-STIFFENED CYLINDERS SUBJECTED TO EXTERNAL HYDROSTATIC PRESSURE.
Research and development rept.,
David Taylor Model Basin Washington D C Structural Mechanics Lab
Myron E. Lunchick. Mar 61, 30p
DTMB-1437

Descriptors: (*Submarine hulls, Buckling (Mechanics)), (*Stiffened cylinders, Buckling (Mechanics)), Hydrostatic pressure, Graphics, Plasticity, Rings, Failure (Mechanics).

The solutions of Reynolds and Lunchick for the plastic shell-buckling pressure of stiffened cylinders subjected to external hydrostatic pressure are presented in graphical form. Numerical examples are given to demonstrate the use of the curves for calculating failure in the asymmetric (lobar) mode and in the axisymmetric mode. (Author)
AD-650 574 HC$3.00 MF$0.65

AN EXPERIMENTAL INVESTIGATION OF THE STRENGTH OF SMALL-SCALE CONICAL REDUCER SECTIONS BETWEEN CYLINDRICAL SHELLS UNDER EXTERNAL HYDROSTATIC PRESSURE.
Research and development rept.,
David Taylor Model Basin Washington D C Structural Mechanics Lab
Richard V. Raetz. Mar 60, 36p
DTMB-1397

Descriptors: (*Submarine hulls, Tensile properties), (*Conical bodies, Tensile properties), Cylindrical bodies, Structural shells, Strain (Mechanics), Hydrostatic pressure, Reduction.

Six conical sections, each connecting two cylindrical shells of different diameters, were subjected to external hydrostatic pressure. The cone angle, shell thickness, and cone-cylinder reinforcement were varied to determine their effects on strains and collapse pressures. Good correlation was obtained between calculated and measured strains. Study of the measured and theoretical strains indicated that, for the range investigated, reinforcement at the cone-cylinder junctures should have little effect on the collapse strength of the conical sections. The observed collapse pressures, although affected by fabrication imperfections, lend support to this contention. (Author)
AD-650 584 HC$3.00 MF$0.65

MATHEMATICAL SHIP SURFACE.
Research and development rept.,
David Taylor Model Basin Washington D C Hydromechanics Lab
P. C. Pien. Jan 60, 39p
DTMB-1398

Descriptors: (*Ship hulls, Mathematical models), Surfaces, Equations, Merchant vessels.

For practical application, the problem of mathematical ship surface was subdivided into two portions: (1) To approximate a given hull form mathematically by a surface equation; and (2) to modify a ship surface equation to obtain the desired changes in hull characteristics from one design to another. For the case of a single-screw, flat-bottom, merchant-ship hull form, a procedure of obtaining a surface equation to fair and to interpolate a given table of offsets was developed. This equation will give not only the waterlines and stations but also the end profile. The numerical computation of such a procedure was programmed into a high-speed electronic computer. From a given table of offsets, any number of waterlines and stations may be computed. The second portion of the work is not included. (Author)
AD-650 585 HC$3.00 MF$0.65

POWERING CHARACTERISTICS OF AN LCVP WITH OPEN SCREW AND KORT NOZZLES FROM TESTS WITH MODEL 4031-1.
Research and development rept.,
David Taylor Model Basin Washington D C Hydromechanics Lab
A. L. Beal, D. L. Blount, and J. Z. McArdle. Feb 60, 27p
DTMB-1406

Descriptors: (*Landing craft, *Marine propulsion), Propellers (Marine), Model tests, Nozzles, Power, Rotation, Steering.
Identifiers: LCVP.

A program was initiated to evaluate the effect of a Kort nozzle propulsion system at high slip ratios and in the free running condition. To accomplish this, it was suggested that both a fixed Kort nozzle, which would require a steering rudder for free running and two flanking rudders for backing, and a rotating Kort nozzle be investigated. The rotating nozzle could satisfactorily propel the craft as well as steer it. However, if desirable, a steering rudder could be installed so that it would only be necessary to rotate the nozzle when large thrust forces were needed as for backing. The actual test program consisted of ahead and backing propulsion, side thrust, and bollard pull tests for an open screw system, a fixed Kort nozzle system, and a rotating Kort nozzle system. (Author)
AD-650 587 HC$3.00 MF$0.65

EVALUATION OF LORAC RADIOLOCATION SYSTEM FOR CONDUCTING SPEED AND MANEUVERING TRIALS OF NAVAL VESSELS.
Evaluation test rept.,
David Taylor Model Basin Washington D C Hydromechanics Lab
Q. R. Robinson, and J. A. Heffner. Feb 60, 20p
DTMB-1409

Descriptors: (*Ships, Performance (Engineering)), (*Radio navigation, Test equipment), Velocity, Maneuverability, Position finding, Tests.
Identifiers: Lorac, Evaluation.

Measurements of the speed and turning characteristics of a test vessel were made independently with Lorac and with the Navy tactical shore station equipment. The report contains a comparison of the test results with comments on utilization of Lorac in conducting trials on Naval vessels. (Author)
AD-650 588 HC$3.00 MF$0.65

STRENGTH OF ANTIPITCHING FINS AND SHIP MOTIONS MEASURED ON USS COMPASS ISLAND (EAG 153).
Research and development rept.,
David Taylor Model Basin Washington D C Structural Mechanics Lab
Louis A. Becker, and Donald J. Duffy. Apr 59, 34p
DTMB-1282

Descriptors: (*System test vessels, *Fins), Pitch (Motion), Motion, Impact shock, Acceleration, Ship hulls, Damping, Stabilization systems, Control surfaces.
Identifiers: EAG 153.

Strains and pressures were measured in the antipitching fins on USS COMPASS ISLAND (EAG 153) and were correlated with simultaneous measurements of sea state and ship motions. A maximum principal stress of 14,000 psi was obtained when the fins slammed in a State 6 head sea at a ship speed of 18.8 knots. As a result of this slam, the peak pressure measured on the fin was 72 psi. It is concluded that the strength of the fins is ample. The above condition was the most severe encountered and caused a maximum vertical acceleration at the bow of plus or minus 0.64 g, amid-

ships acceleration of plus or minus 0.26 g,, and a maximum pitch angle of plus or minus 6 1/2 degrees. It is noted that both vertical and horizontal modes of vibration of the ship's hull were excited. As a secondary objective, the effectiveness of the fins in reducing ship motions is analyzed. While some reduction in pitch is indicated, it is believed that duplicate trials with and without fins are required to obtain conclusive results. (Author)
AD-650 591 HC$3.00 MF$0.65

BUCKLING AND ULTIMATE STRENGTHS OF PLATING LOADED IN EDGE COMPRESSION.
Progress rept. no. 1 - 6061-T6,
David Taylor Model Basin Washington D C Structural Mechanics Lab
Donald J. Duffy, and Ralph B. Allnutt. Apr 60, 21p
DTMB-1419
Rept. on proj. Aluminum Plates.

Descriptors: (*Ship plates, Tensile properties), Buckling (Mechanics), Loading (Mechanics), Compressive properties, Welds, Aluminum, Stresses.

The buckling and ultimate strengths of welded and nonwelded 6061-T6 aluminum plates were determined. Each plate was simply supported and loaded in edge compression. Ultimate strengths of nonwelded plates were 2 to 15 percent less, depending upon the b/t ratio, than those obtained by the present Bureau of Ships design procedure. Ultimate strengths of welded plates were 0 to 30 percent less, depending upon the location of the weld. (Author)
AD-650 594 HC$3.00 MF$0.65

INSTRUMENTATION SYSTEM FOR EVALUATION OF AUTOMATIC DEGAUSSING CONTROL SYSTEMS.
Research and development rept.,
David Taylor Model Basin Washington D C 0900
George N. Mitsilias. Dec 60, 40p Rept no.
DTMB-1428

Descriptors: (*Degaussing, *Control systems), (*Minesweepers, Instrumentation), Automatic, Degaussing, Naval research, Effectiveness, Design, Instruction manuals, Diagrams.

The report describes special instrumentation recently developed by the David Taylor Model Basin which is now in use at the Navy degaussing stations at Norfolk, Virginia and San Diego, California for the evaluation of automatic degaussing control systems installed aboard fleet minesweepers. The design problems are reviewed and the system's function is outlined. Photographs, schematic diagrams, and references are included with complete operating and maintenance Instructions. (Author)
AD-650 595 HC$3.00 MF$0.65

WAKE SURVEY FOR A PASSENGER-CARGO VESSEL, NS SAVANNAH, REPRESENTED BY MODEL 4671.
Research and development rept.,
David Taylor Model Basin Washington D C Hydromechanics Lab
Mary C. Dickerson. Jul 63, 15p
DTMB-1746

Descriptors: (*Cargo ships, Model tests), (*Nuclear powered vessels, Model tests), Propellers (Marine), Wake, Velocity, Harmonic analysis.
Identifiers: Savannah nuclear cargo ship.

A series of tests was conducted on TMB Model 4671, a 22.72-foot wax model of the passenger-cargo ship, NS SAVANNAH. The results of a velocity survey of the propeller are presented.
AD-650 597 HC$3.00 MF$0.65

COOPERATIVE ROTATING-ARM AND STRAIGHT-LINE EXPERIMENTS WITH ITTC STANDARD MODEL (MARINER TYPE SHIP).
Research and development rept.,
David Taylor Model Basin Washington D C Hydromechanics Lab
Morton Gertler. Jun 66, 81p
DTMB-2221

Descriptors: (*System test vessels, Model tests), Ship models, Fluid dynamic properties, Test facilities, Maneuverability, Ship hulls, Propellers (Marine), Model basins.

The report describes in detail the model, apparatus, and techniques used in the investigation and presents the experimental results in both tabular and graphical form as nondimensional hydrodynamic coefficients and as stability and control derivatives. It is concluded that, if the same model, instrumentation, test procedures, and initial conditions are used, the same numerical values can be obtained for the individual static stability and control derivatives from rotating-arm tests as from straightline tests. (Author)
AD-650 598 HC$3.00 MF$0.65

RESISTANCE CHARACTERISTICS FOR LCM-A AS REPRESENTED BY MODEL 4746.
Research and development rept.,
David Taylor Model Basin Washington D C Hydromechanics Lab
D. L. Blount. Aug 59, 11p
DTMB-1334

Descriptors: (*Landing craft, *Drag), Model tests, Ship models, Ship hulls.
Identifiers: LCM-A.

Resistance characteristics of the LCM-A vehicle were determined by model tests. The report describes the special procedures employed and gives the results of the tests. (Author)
AD-650 599 HC$3.00 MF$0.65

SOME CASES OF VIBRATION FORCED BY BASE MOTIONS OR BY EXTERNAL FORCES.
Research and development rept.,
David Taylor Model Basin Washington D C Structural Mechanics Lab
E. H. Kennard. Dec 60, 40p
DTMB-1394

Descriptors: (*Ships, Vibration), Structures, Damping, Force (Mechanics), Rotation, Motion, Mathematical analysis, Cantilever beams, Supports.

The report gives formulas for the response of selected simple vibratory systems to either forced motions of their supports or to external forces. The systems treated include a sprung mass, a sprung rotor, a cantilever beam, and a general elastic system attached to a rigid base. (Author)
AD-650 600 HC$3.00 MF$0.65

POWERING CHARACTERISTICS AND FLOW STUDIES FOR AN AMPHIBIOUS ASSAULT SHIP, MODELS 4662 AND 4704.
Research and development rept.,
David Taylor Model Basin Washington D C Hydromechanics Lab
A. H. Weaver, Jr. Jun 59, 36p
DTMB-1316

Descriptors: (*Naval vessels (Support), *Marine propulsion), Amphibious operations, Fluid flow, Model tests, Drag, Power.

Two models of an Amphibious Assault Ship were tested by the David Taylor Model Basin. Model 4662 represented the original, single-screw LPH and Model 4704, the LPH-2. Resistance and propulsion tests were made and flow studies conducted in the circulating-water channel. (Author)
AD-650 602 HC$3.00 MF$0.65

VIBRATION SURVEY ON U. S. ARMY SHIP LT. COL JOHN U. D. PAGE (BDL-1X).
Research and development rept.,
David Taylor Model Basin Washington D C Structural Mechanics Lab
Erich Buchmann, and John T. Birmingham. Jun 59, 19p
DTMB-1343

Descriptors: (*Landing craft, Vibration), Ballast tanks, Propellers (Marine), Frequency, Ship plates.
Identifiers: BDL-1X.

A vibration survey was conducted on U. S. Army ship LT COL JOHN U.D. PAGE (BDL-1X) to ascertain the cause of excessive vibration of bulkheads bounding the aft ballast tanks in the area of the shaft alleys. The tests were conducted for two tank loading conditions during steady runs at various propeller pitch settings and during maneuvers. Natural frequencies of the bulkhead plating panels for loaded tanks were nearly the same as double blade frequency at 830 engine rpm, whereas those for empty tanks were considerably higher. Vibration levels were unacceptably high only for the condition of loaded tanks and with propeller pitch settings larger than 0.5 at 830 engine rpm. The vibration of the bulkhead panels can be traced to a sharp increase of vibration amplitudes of the propeller housing for pitch settings larger than 0.5 and engine speed of 830 rpm. This sharp increase of vibration level is probably of hydrodynamic origin. (Author)
AD-650 607 HC$3.00 MF$0.65

STUDY OF STACK-GAS FLOW ON LSD28- AND LSD32-CLASS SHIPS FROM TESTS WITH MODEL 4552 IN THE CIRCULATING-WATER CHANNEL.
Research and development rept.,
David Taylor Model Basin Washington D C Hydromechanics Lab
N. L. Ficken, and H. F. Lo. Jul 60, 27p
DTMB-1335

Descriptors: (*Landing craft, Model tests), (*Waste gases, Gas flow), Air pollution, Ship structural components, Contamination, Design, Velocity, Turbulent boundary layer, Wind.

A test technique was developed by which stack-gas flow patterns can be predicted from tests in the circulating-water channel. Tests were conducted with a model of the superstructure of LSD28. It was determined that increased stack height and/or increased gas velocity is required to eject the gas beyond the turbulent boundary zone. Tests were conducted also with models of the superstructures of LSD28 and LSD32-35 fitted with TMB-designed stacks. The flow was observed to be acceptable with gas velocities in excess of twice the relative wind velocity. (Author)
AD-650 608 HC$3.00 MF$0.65

POWERING PREDICTIONS FOR AN AMPHIBIOUS ASSAULT SHIP WITH DESIGN PROPELLER MODEL 4704.
Research and development rept.,
David Taylor Model Basin Washington D C Hydromechanics Lab
A. H. Weaver, Jr., and G. L. Ober. Aug 59, 12p
DTMB-1316-2

Descriptors: (*Naval vessels (Support), *Marine propulsion), Propellers (Marine), Cavitation, Power, Amphibious operations, Model tests, Performance (Engineering), Fluid flow.

The report gives results of additional powering tests for an Amphibious Assault Ship. Model 4704 was tested at full-load displacement and fitted with Propeller 3763, a new design. Open-water characteristics for this propeller are also given. (Author)
AD-650 609 HC$3.00 MF$0.65

A STUDY OF THE HYDRODYNAMIC LOADS ON A CYLINDRICAL MAST AND RADOME.
Research and development rept.,
David Taylor Model Basin Washington D C Hydromechanics Lab
Raphael D. Cahn. May 58, 19p
DTMB-1239

Descriptors: (*Submarines, Hydrodynamics), (*Radomes, Loading (Mechanics)), Cylindrical bodies, Drag, Lift, Water waves, Impact shock, Design.

The predominant forces on a mast projecting from a submerged submarine through the surface are steady drag, periodic lift, and wave impact. As the natural frequency of vibration of the mast-radome configuration under consideration is in the vicinity of the vortex shedding frequency, a catastrophic instability should be expected. Since the function of the radome at the top of the mast is to protect the encapsulated instruments, any large deflection of the dome could endanger the contents. The forces on the dome due to drag and breaking waves are estimated for particular operating conditions, numerical values being presented in tabular form for the force distribution over the dome. Also given is the frequency of occurrence of the significant wave for these conditions. The impact force prevails over all others and represents the major obstacle to successful operation of the system in high seas. Pertinent criteria are established to serve as guidelines for the design of the system. (Author)
AD-650 610 HC$3.00 MF$0.65

POWERING CHARACTERISTICS FOR LCM-A AS REPRESENTED BY MODEL 4746.
Research and development rept.,
David Taylor Model Basin Washington D C Hydromechanics Lab
D. L. Blount. Dec 59, 17p
DTMB-1334-2

Descriptors: (*Landing craft, *Marine propulsion), Power, Ship models, Model tests, Propellers (Marine), Nozzles.

Powering characteristics of the LCM-A vehicle were determined by tests. The report describes the special procedures employed and gives the results of the propulsion tests. (Author)
AD-650 611 HC$3.00 MF$0.65

SHIPBOARD SYSTEMS COSTS: A FUNCTIONAL ANALYSIS OF WORK ABOARD SHIP. THE SS SHELDON LYKES: A DRY CARGO SHIP IN THE SOUTH ATLANTIC SERVICE.
National Academy of Sciences-National Research Council Washington D C Shipboard Mechanization/Manpower Comm
Mar 67, 36p
Contract Nonr-2300 (23)

Descriptors: (*Cargo ships, *Manpower studies), (*Merchant vessels, Systems engineering), Costs, Functional analysis, Information retrieval, Job analysis, Management engineering, Manpower.

The report is one in a series detailing the results of systems analysis work aboard twenty (20) different merchant ships. It presents information relating to one of these ships. The report also describes a system for the retrieval and analysis of data required for the effective management of a ship. (Author)
AD-650 625 HC$3.00 MF$0.65

HYDRODYNAMIC DESIGN AND EVALUATION OF A SIZE 5 REINFORCED-PLASTIC MINESWEEPING FLOAT.
David Taylor Model Basin Washington D C 0900
Peter K. Spangler. Apr 60, 23p Rept no. DTMB-1422

Descriptors: (*Floating bodies, *Reinforced plastics), Hydrodynamic configurations, Model tests, Mine clearance, Naval mines, Design.

An 0 Type, Size 5, Reinforced-plastic Minesweeping Float was designed and fabricated at the David Taylor Model Basin. Tests were conducted in the circulating-water channel to determine the net buoyancy, lift, drag, and towing characteristics. Tests to verify towing characteristics were also made using a small boat in the Chesapeake Bay. After modifications to towpoint and control surfaces, the float towed in a stable manner over the speed range of 0 to 7 knots. It is concluded that a Size 5 Minesweeping Float fabricated from plastic will have satisfactory towing characteristics and will allow a substantial reduction in the handling weight. (Author)
AD-650 636 HC$3.00 MF$0.65

A PHOTOELASTIC INVESTIGATION OF STRESSES IN THE HUB OF A PROPOSED 20,000-SHP CONTROLLABLE-PITCH PROPELLER,
David Taylor Model Basin Washington D C Structural Mechanics Lab
John E. Buhl, Jr., and Joseph S. Brock. Jul 60, 23p
DTMB-1417

Descriptors: (*Propellers (Marine), Photoelasticity), Variable-pitch propellers, Stresses, Model tests, Propeller hubs.

A three-dimensional photoelastic model of the hub of a proposed 20,000-shaft horsepower controllable-pitch marine propeller was built and tested. Stresses were determined by strain gages and photoelastic measurements at selected locations for the 'crash-stop' load condition. The hub stresses for the case of one blade hitting a submerged object were investigated to a limited extent by strain gages. Stress concentrations at the inside corners were extremely high, causing stresses of the order of 65,000 psi to 84,000 psi in the prototype. It is recommended that larger fillet radii be used at all inside corners to reduce the stresses. (Author)
AD-650 643 HC$3.00 MF$0.65

WAVE PUMPING AND ITS EFFECTS ON THE DESIGN AND OPERATION OF AIR-CUSHION SHIPS.
Technical memo.,
Navy Marine Engineering Lab Annapolis Md
M. W. Beardsley. Mar 67, 29p Rept no. MEL-48/67

Descriptors: (*Ground effect machines, Fluid dynamic properties), Ocean waves, Aerodynamic characteristics, Design, Operation, Vibration.
Identifiers: Surface effect ships, Wave pumping.

Wave pumping is defined as the variation of plenum-air volume and/or pressure caused by the passage of waves through the air-cushion plenum of an air-cushion (or surface-effect) ship. These studies indicate that, to maintain constant deck height (smooth ride) when operating with adverse wave-pumping conditions, a large high-speed air-cushion ship will require a plenum-air-supply system having approximately half the power of the propulsion system. If the plenum-air-supply system does not adequately compensate for wave-pumping effects, the air-cushion ship will experience heave vibrations which may be intolerable for on-board personnel; or it may descend into the water with resulting large increase in drag. (Author)
AD-650 669 HC$3.00 MF$0.65

PRELIMINARY DESIGN OF WATER-JET PROPULSION SYSTEMS FOR 4000-TON CAPTURED AIR BUBBLE (CAB) SHIP.
Research and development rept.,
Navy Marine Engineering Lab Annapolis Md
John H. Garrett. Mar 67, 43p Rept no. MEL-41/67

Descriptors: (*Ground effect machines, Jet propulsion), (*Jet propulsion, Liquid jets), (*Marine propulsion, Jet propulsion), Water, Weight, Performance (Engineering), Optimization, Design, Ship hulls.
Identifiers: Captured air bubble ships.

Preliminary estimates are made of weight and performance of four different arrangements of machinery for a water-jet propelled 4000-ton captured air bubble ship. The methods used for optimizing the V sub j/V sub o ratio and for calculating performance are outlined. All four machinery systems provide cruising speeds of 78 to 80 knots in smooth water using 150,000 horsepower, exclusive of the power required to supply cushion air. Weights of the complete machinery systems vary from 3.8 to 5.0 pounds per horsepower. (Author)
AD-650 685 HC$3.00 MF$0.65

PROPULSION SHAFT CALIBRATION FOR TORSIONAL MODULUS OF RIGIDITY.
Research and development rept.,
David Taylor Model Basin Washington D C Hydromechanics Lab
John H. Brandau. Mar 62, 21p
DTMB-1517

Descriptors: (*Marine propulsion, Shafts), (*Shafts, Calibration), Mechanical properties, Torque, Propellers (Marine), Test equipment, Test methods, Temperature.

A program was instituted in 1959 at the Taylor Model Basin for the purpose of determining the correct modulus of rigidity in torsion for steel propulsion shafting of the types used presently by the U. S. Navy. In addition, it was desired to determine the most efficient method of obtaining the modulus and to investigate the effect of shaft temperature on the modulus, as well as the relative values of modulus for stub shafts and corresponding test coupons. Results are presented for test data obtained over the past 15 years. (Author)
AD-650 693 HC$3.00 MF$0.65

THE DAMPING OF AN OSCILLATING ELLIPSOID NEAR A FREE SURFACE.
Research and development rept.,
David Taylor Model Basin Washington D C Hydromechanics Lab
J. N. Newman. Feb 62, 18p
DTMB-1500
Availability: Published in Journal of Ship Research v5 n3 p1-18 Dec 1961.

Descriptors: (*Ships, Oscillation), (*Ellipsoids, Oscillation), Damping, Incompressible flow, Surfaces, Slender bodies, Motion, Mathematical analysis.

The six damping coefficients are derived for an ellipsoid with three unequal axes, which is moving with constant horizontal velocity beneath a free surface, and oscillating in any one of six degrees of freedom. It is assumed that the flow is irrotational and incompressible, and that the ellipsoid is either slender or deeply submerged, in order that the disturbance of the free surface be small. With these assumptions the six damping coefficients are derived and computations are presented for two particular ellipsoids. Of special interest is the occurrence of negative damping at very high forward speeds. (Author)
AD-650 703 Not available from CFSTI.

THE ANALYSIS OF THE CONTROL OF ACTIVATED ANTI-ROLL TANKS.

Final rept.,
Illinois State Natural History Survey Urbana
William C. Webster, and P. Dugan. Dec 66, 266p
Rept no. Hydro-TR-490-2
Contract NObs-90164

Descriptors: (*Ballast tanks, Control systems), (*Ships, Ballast tanks), Stabilization systems, Ocean waves, Motion, Mathematical analysis, Pumps, Equations of motion.

The application of activated, anti-roll tanks is considered in detail. Particular attention is paid to the configuration and the design of the control system to actuate the tank. In the first sections, the equations of motion of the ship, tank and pumps as well as the forces created by the seaway are derived. The methods of selecting the control are then discussed and the techniques of solving both the linearized and the full, non-linear equations are presented. Using these analysis techniques, it was determined that the active tank control could best be selected on the basis of minimizing the response of the ship to an impulsive roll velocity. The control systems so selected were used to estimate the roll reductions in various sea states of three typical type ships. It was shown that the active tank is significantly better in reducing the roll of the ship than the ordinary passive anti-roll tank. With proper design, it is shown that this can be accomplished without extremely large horsepowers. The nonlinear studies conducted showed that the effects of saturation of the tank were to significantly degrade the tank's performance. Finally, a technique for choosing an optimum controller using Liapounov theory is outlined. (Author)
AD-650 724 HC$3.00 MF$0.65

EVALUATING THE SEAKEEPING PERFORMANCE OF DESTROYER-TYPE SHIPS,
Webb Inst of Naval Architecture Glen Cove NY
Norman A. Hamlin, and Roger H. Compton. Jan 67, 138p
Contract Nonr-4394 (00)

Descriptors: (*Destroyers, *Design), (*Destroyers, Atlantic Ocean), (*Naval vessels (Combatant), *Ocean waves), Velocity, Probability, Ships, Motion, Performance (Engineering).

A technique for the evaluation of the seakeeping performance of destroyer-type ships is presented and applied to four radically different hypothetical designs. The procedure involves first the adoption of suitable criteria of seagoing performance, with the tentative selection of numerical indices related to ship motion. Next to be considered is the determination of the behavior of the four designs in head seas in the North Atlantic Ocean, utilizing linear superposition techniques to evaluate the response of the vessels to different realistic short-crested sea spectra. Calculations are based upon theoretical response amplitude operators obtained by applying strip theory to determine the response of the vessels to regular waves. The final evaluation of seakeeping performance is then obtained in the form of long term probability of not exceeding the stated numerical indices as functions of ship speed.
AD-650 750 HC$3.00 MF$0.65

SHIPBOARD SYSTEMS COSTS: A FUNCTIONAL ANALYSIS OF WORK ABOARD SHIP, SS CITIES SERVICE BALTIMORE: A TANKER IN THE ATLANTIC COASTAL SERVICE.
National Academy of Sciences-National Research Council Washington D C Shipboard Mechanization/Manpower Comm
Mar 67, 35p
Contract Nonr-2300 (23)

Descriptors: (*Tankers, *Manpower studies), (*Merchant vessels, Systems engineering), Costs, Functional analysis, Information retrieval, Manpower, Decision making, Management engineering.

The report is one in a series detailing the results of systems analysis work aboard twenty (20) different merchant ships. It presents information relating to one of these ships. The report also describes a system for the retrieval and analysis of data required for the effective management of a ship. (Author)
AD-650 843 HC$3.00 MF$0.65

HYDRODYNAMICS OF SLAMMING OF SHIPS,
David Taylor Model Basin Washington D C 0900
V. G. Szebehely. Jul 52, 35p Rept no. DTMB-823

Descriptors: (*Ships, Impact shock), Hydrodynamics, Design, Pressure, Force (Mechanics), Differential equations.
Identifiers: Slamming impact.

The report offers a hydrodynamic discussion of slamming for the use of naval architects. The effects of recognized parameters in naval architecture are studied. The theoretical investigation, based on the concepts of added mass, of impulsive pressure, and on Wagner's theory of impact, results in formulas for estimating forces and pressure distribution on bottoms of nonzero deadrise angle. An outline for further theoretical and experimental research is given and some preliminary experiments are reported. (Author)
AD-650 887 HC$3.00 MF$0.65

A STUDY OF THE FLOW THROUGH A VERTICAL AXIS PROPELLER,
Engineering Research Associates Toronto (Ontario)
J. A. McKillop. Apr 65, 61p Rept no. ERA-60-1
Contract Nonr-4525 (00) (X)

Descriptors: (*Propellers (Marine), Fluid flow), Propeller blades, Marine propulsion, Three-dimensional flow, Flow visualization, Thrust, Performance (Engineering), Canada.

The application of a three dimensional flow visualisation technique to the study of the flow pattern of a vertical axis propeller is described. Photographs of the streamlines encountered by a blade throughout a complete orbital cycle are shown and analysed to yield the inflow vector. The results are compared with blade normal force time histories obtained by strain gage readings from one blade root. The computed thrust is finally compared with existing performance data. (Author)
AD-650 935 HC$3.00 MF$0.65

THRUST AND TORQUE FLUCTUATIONS FOR APA 249, TMB MODEL 4414,
David Taylor Model Basin Washington D C Hydromechanics Lab
H. Y. Yeh. Jan 60, 21p
DTMB-1364

Descriptors: (*Transports, Propellers (Marine)), (*Propellers (Marine), Force (Mechanics)), Thrust, Torque, Model tests, Analysis of variance, Wake.

A velocity survey was conducted on Model 4414 to obtain data needed to calculate the thrust and torque fluctuations due to nonuniform wake distribution over the propeller disk for the APA249. Detailed calculating procedures are given. (Author)
AD-650 998 HC$3.00 MF$0.65

THE TOWING CHARACTERISTICS OF A PROJECT PHOENIX BOW-BLOCKER HOSE,
David Taylor Model Basin Washington D C Hydromechanics Lab
For primary bibliographic entry see Field 13K.
AD-650 999 HC$3.00 MF$0.65

COMPARATIVE RESISTANCE TESTS WITH ATTC STANDARD MODEL,
David Taylor Model Basin Washington D C 0900
M. Gertler, and C. H. Hancock. Jul 59, 57p Rept no. DTMB-1357
Prepared in cooperation with Newport News Shipbuilding and Dry Dock Co., Va. Presented at the General Meeting of the American Towing Tank Conference, California Univ., Berkeley, 31 August-2 September 1959.

Descriptors: (*Drag, Test methods), (*Ship models, Drag), Test facilities, Instrumentation, Model tests.

A program of comparative resistance tests involving the use of a standard model was established. The report presents the basic considerations underlying the program, a description of the ATTC Standard Model, and comparisons of the results of resistance tests made by three of the participating towing tanks. The test techniques, instrumentation, and facilities used for the program are described by the individual organizations in the appendixes. (Author)
AD-651 094 HC$3.00 MF$0.65

AN EXPERIMENTAL INVESTIGATION OF PROPELLER BLADE THICKNESS AND APPENDAGE ASYMMETRY ON PROPELLER-APPENDAGE INTERACTION,
Oceanics Inc Plainview N Y
August F. Lehman. Jul 66, 90p Rept no. 66-24
Contract Nonr-3905 (00) (X)

Descriptors: (*Propellers (Marine), Configuration), Hydrodynamics, Interactions, Propeller blades, Thickness, Force (Mechanics).

Experimental studies were undertaken in a water tunnel with three dimensional appendages involving the effect of propeller blade thickness and appendage asymmetry in the induced transverse and axial appendage forces. The propellers were mounted downstream of the appendage and the distance between the appendage and propeller varied. The propellers were tested both as three bladed units and as single bladed units. Both appendage asymmetry and propeller blade thickness have notable effects on the induced appendage forces. It appears as if the use of a single bladed propeller offers a promising technique for predicting multi-bladed performance in terms of induced appendage forces. (Author)
AD-651 097 HC$3.00 MF$0.65

DEEP-OCEAN BIODETERIORATION OF MATERIALS. PART VI. ONE YEAR AT 2,370 FEET.
Technical rept.,
Naval Civil Engineering Lab Port Hueneme Calif
James S. Muraoka. May 67, 65p Rept no. NCEL-TR-525
See AD-642 838.

Descriptors: (*Deep water, Pacific Ocean), (*Deterioration, *Materials), Marine biology, Environmental tests, Plastics, Elastomers, Marine borers, Bacteria, Barnacles, Elastomers, Data, Reports, Non-metals, Metals, Degradation, Microorganisms, Wood, Fibers (Natural).

As Part VI of a series of reports on the biological deterioration of materials in the deep ocean, this report covers the data obtained after exposing metallic and nonmetallic specimens for 13.4 months on the floor of the Pacific Ocean at a depth of 2,370 feet (Test Site II). The specimens were attached to a Submersible Test Unit that was emplaced in April 1965 and retrieved in May 1966. Preliminary examination of the specimens was made aboard ship, and the final examination, tests, and analyses were performed at the Naval Civil

Engineering Laboratory. On recovery, most of the plastic materials and all of the rope specimens were covered with bacterial slime. Cotton and manila ropes were severely deteriorated by marine microorganisms. Wood panels, certain plastics, and manila ropes were attacked by molluscan borers. Some of the plastics were attacked by borers directly from seawater environment without the aid of wood bait pieces. Hydroids and tubeworms were found on metal panels. Sea anemone, snails, and crabs were also found attached to various test panels. The surface of a silicone rubber electrical cable insulation was deteriorated by some marine organisms. Typical fouling organisms such as barnacles and bryozoa were not found. Glass, elastomers, and certain plastics were not adversely affected. Data from evaluation of these specimens are presented. (Author)
AD-651 124 HC$3.00 MF$0.65

13K. PUMPS, FILTERS, PIPES, FITTINGS, TUBING, AND VALVES

A TUBULAR SPRING VALVE USED AS A TIGHT AND THIN-WALLED CORE-RETAINER.
Scripps Institution of Oceanography La Jolla Calif
For primary bibliographic entry see Field 8G.
AD-650 723 Not available from CFSTI.

THE TOWING CHARACTERISTICS OF A PROJECT PHOENIX BOW-BLOCKER HOSE.
David Taylor Model Basin Washington D C Hydromechanics Lab
Shelton M. Gay, Jr. Oct 59, 20p
DTMB-1383

Descriptors: (*Lowing cables, *Hoses), Model tests, Theory, Model basins, Mathematical analysis, Tensile properties, Deep water, Hydrostatic tests, Naval research.

Towing tests of a freely trailed 50-foot flexible hose were conducted in the deep-water basin at the David Taylor Model Basin. Towing tensions and angles were recorded as a function of the towing speed. The angle data were corrected to standard conditions and compared with values predicted from theory. It was concluded that the hose will tow satisfactorily for the intended purpose and that the towing attitude may be predicted on the basis of two-dimensional cable theory. (Author)
AD-650 999 HC$3.00 MF$0.65

AEROJET- GENERAL NUCLEONICS MERCURY CORROSION LOOP PUMP.
Aerojet-general Nucleonics, San Ramon, Calif.
E. F. Mc Daniel, and J. H. Ralphs. 17 Feb 64, 33p
NASA-CR-72201, TM-390-64-8-204

Descriptors: *Corrosion test, *Loop, *Mercury alloy, *Pump, *Steel, Alloy, Boiling, Corrosion, Design, Feasibility, Mechanical, Metal, Seal, Stainless, Test.

For abstract, see STAR 05 11.
N67-22842 HC$3.00 MF$0.65

COMPOUND PRESSURE AND VACUUM RELIEF VALVE, 2-INCH. LADEWIG VALVE COMPANY PART NUMBER 3302- F, NASA DRAWING NUMBER 75 M04406 PRV-3.
Chrysler Corp., New Orleans, La.
5 Dec 66, 42p NASA-CR-83550, TR-RE-CCSD-FO-1112-3
Contract NAS8-4016

Descriptors: *Environmental testing, *Function test, *Pressure relief valve, *Saturn ib launch vehicle, Burst, Environment, Fog, Function, High temperature, Low temperature, Pressure, Relief, Salt, Test, Testing, Vacuum, Valve.

For abstract, see STAR 05 11.
N67-23278 HC$3.00 MF$0.65

13L. SAFETY ENGINEERING

HAZARDS OF CARBON TETRACHLORIDE FIRE EXTINGUISHERS.
Recommended practices.
Federal Fire Council Washington D C
Jan 67, 21p Rept no. RP-3

Descriptors: (*Fire extinguishers, Carbon tetrachloride), (*Carbon tetrachloride, Hazards), Safety, Toxicity, Poisoning, Effectiveness.

It is recommended that carbon tetrachloride extinguishers, including bulb-type devices, should be immediately removed from the Federal Government's operations. Their inefficiency in extinguishing fires, poor maintenance characteristics, and death-dealing potential justifies their immediate and complete removal from the Government's inventory. Existing units should be destroyed and not made available for transfer within and/or without the Federal establishment. Also, no future carbon tetrachloride fire extinguishers should be purchased as part of any Federal contract nor allowed on Federal property. Other halogenated hydrocarbons should be watched and/or investigated to see if they have a similar hazard potential as carbon tetrachloride. Because of its widespread and extended use, documentation of the ill effects of carbon tetrachloride has been easier and more complete than other halogenated hydrocarbons. Since animal testing does not exactly duplicate conditions of humans, there is margin for error in assigning toxicity ratings and adequately evaluating side effects. Improved techniques and more investigations of these aspects may help to reduce these errors. (Author)
AD-650 674 HC$3.00 MF$0.65

CASE HISTORIES OF DEATHS AND INJURIES FROM CARBON TETRACHLORIDE FIRE EXTINGUISHERS.
Federal Fire Council Washington D C
Harry Shoub. 17 Apr 67, 13p

Descriptors: (*Fire extinguishers, Carbon tetrachloride), (*Carbon tetrachloride, Toxicity), Mortality rates, Wounds + injuries, Hazards, Safety.
Identifiers: Case.

The case histories represent incidents where the use of carbon tetrachloride as a fire extinguishing agent has resulted in injury and/or death. This compilation does not represent a complete literature search. There are a total of 16 deaths and 33 injuries from these 27 cases. (Author)
AD-650 734 HC$3.00 MF$0.65

AN ANNOTATED BIBLIOGRAPHY ON CARBON TETRACHLORIDE AS A FIRE EXTINGUISHANT.
Federal Fire Council Washington D C
Harry Shoub. 17 Apr 67, 9p

Descriptors: (*Carbon tetrachloride, Fire extinguishers), (*Bibliographies, Carbon tetrachloride), Safety, Toxicity, Poisoning.

The article presents an annotated bibliography on carbon tetrachloride as a fire extinguishant. A total of 72 references are listed.
AD-650 735 HC$3.00 MF$0.65

EVALUATION OF FLIGHT FIRE PROTECTION MEANS FOR INACCESSIBLE AIRCRAFT BAGGAGE COMPARTMENTS.
Technical development rept.,
Technical Development and Evaluation Center Indianapolis Ind
L. A. Asadourian. Jun 51, 34p Rept no. 146

Descriptors: (*Aircraft fires, *Transport planes), (*Aircraft cabins, *Fire safety), Cargo, Fire alarm systems, Photoelectric materials, Instrumentation, Fire extinguishers, Fire resistant materials, Bags (Containers), Tests, Civil aviation.

The problem of providing adequate fire protection in flight for inaccessible aircraft baggage compartments was investigated in the laboratory. As the packaging, handling and shipping methods used for commercial cargo are subject to existing legislation, this program was confined to investigating those fires which could originate within personal baggage. The investigation was divided into four sections: luggage-fire characteristics, fire detection, fire extinguishment and fire control. (Author)
AD-650 923 HC$3.00 MF$0.65

RESEARCH STUDY ON HEF FIRE FIGHTING,
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
J. T. O'Donovan, and R. M. Fristrom. Sep 62, 6p
Rept no. CF-3001
Contract NOw-62-0604

Descriptors: (*Fire safety, *Fuels), (*Boranes, Fire safety), (*Liquid rocket fuels, Fire safety), Organoboranes, Fire extinguishers, Sensitivity, Hydrolysis, Reviews.

A survey is made of approaches made by various organizations to the problem of fighting fires involving high energy fuels.
AD-650 982 HC$3.00 MF$0.65

DETAILED FEDERAL FIRE EXPERIENCE FOR FISCAL YEAR 1965.
Federal Fire Council Washington D C
Sep 66, 44p
See also AD-639 914.

Descriptors: (*Fire safety, United States Government), Statistical data, Damage, Casualties, Costs, Fires.

This is the only compilation made of total Federal fire losses. The report is a tool promulgated by the Council for use in up-grading fire safety in the Federal Government. Federal fire loss reports during Fiscal Year 1965 show an approximate 30% increase in the number of fires, deaths, and monetary losses. For the most part this is due to increased activity of aerospace vehicles and more complete reporting.
AD-651 007 HC$3.00 MF$0.65

MANUAL OF DATA GATHERING PRACTICE RELATIVE TO THE REUSABILITY OF BUILDINGS AFTER A WARFIRE,
Lin (T Y) and Associates Van Nuys Calif 05
Ray Adams, and Ian R. Stubbs. May 66, 48p
Prepared in cooperation with Stanford Research Inst., Menlo Park, Calif. Contract OCD-PS-64-201, see also AD-651 010.

Descriptors: (*Buildings, Fires), (*Warfare, Civil defense systems), Fire extinguishers, Costs, Structures, Construction materials, Walls, Floors, Digital computers, Problem solving.

The manual deals with pertinent conditions of, in and around buildings, terminology, and surveying technique in detail. The appendices contain tables of pertinent factors and a fairly simple method for use in estimating the percents of building cost to be assigned to each of the several component major assemblies. The scope of detail, which is not useful unless presented in detail, precludes the condensation of this document. Only its character and use may be abstracted meaningfully.
AD-651 009 HC$3.00 MF$0.65

TRIAL SURVEY AND ANALYSIS OF SEVERAL BUILDINGS RELATIVE TO THEIR REUSABILITY AFTER A WARFIRE.
Final rept.,
Lin (T Y) and Associates Van Nuys Calif 05
Ray Adams, and Ian R. Stubbs. May 66, 84p
Prepared in cooperation with Stanford Research Inst., Menlo Park, Calif. Contract OCD-PS-64-201. See also AD-651 009.

Descriptors: (*Buildings, Fires), (*Warfare, Civil defense systems), Exposure, Ignition, Computer programs, Instruction manuals, Fire safety, Nuclear warfare, Concrete, Reinforcing materials, Structures.

Performance test of computer program, developed by performing agency, which processes building data obtained by surveys relative to external fire exposure, interior fire load, ASTM fire rating of components and passive and active fire defenses, and produces the probability of the building's ignition by external exposure to burning adjacent buildings or yard storage and a relative index, on a scale from zero to one, of the building's post-warfire reusability if it does suffer internal ignition. Thirteen Los Angeles area buildings were surveyed and analyzed and results appear to be reasonable. The accompanying user's manual provides step-by-step instructions for guidance of persons making building surveys to gather input data for the program. Pertinent conditions of, in and around buildings, terminology, and surveying and data recording techniques are given in detail.
AD-651 010 HC$3.00 MF$0.65

CHARRING RATE OF SELECTED WOODS--TRANSVERSE TO GRAIN.
Forest Products Lab Madison Wis
For primary bibliographic entry see Field 11L.
AD-651 143 HC$3.00 MF$0.65

QUALITATIVE EFFECTS ON SAFETY AND CONSTRUCTION MATERIALS OF 1300 DEG F SODIUM-POTASSIUM SPRAY IN AIR AND NITROGEN.
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
For primary bibliographic entry see Field 20M.
For abstract, see STAR 05 11.
N67-23334 HC$3.00 MF$0.65

PAVEMENT ICING WARNING SYSTEMS LABORATORY EVALUATION OF ECONOLITE AND NELSON PROTOTYPE DEVICES.
California State Div. of Highways, Materials and Research Dept.
For primary bibliographic entry see Field 13B.
PB-174 482 HC$3.00 MF$0.65

13M. STRUCTURAL ENGINEERING

DEVELOPMENT OF AN INFLATABLE SELF-RIGIDIZING SPACE SHELTER AND SOLAR COLLECTOR FROM HONEYCOMB SANDWICH MATERIAL.
Rept. for 1 Jan-10 Oct 63,
Geophysics Corp. of America, Anoka, Minn.
Ivan W. Russell, Nels S. Hanssen, and William J. McKillip. Apr 64, 121p
APL-TDR-64-29
ContractAF 33 (657)-10409
Prepared in cooperation with Archer Daniels Midland Co., Minneapolis, Minn. Report on Aerospace site support techniques.

Descriptors: (*Inflatable structurres, Plastics), (*Shelters, Inflatable structures), (*Honeycomb cores, Inflatable structures), Glass textiles, Laminated plastics, Epoxy plastics, Isocyanate plastics, Acrylic resins, Polyester plastics, Styrene plastics, Amino plastics, Plasticizers, Catalysts, Vapors, Aging (Materials), Impregnation, Triazines, Amines, Films, Sandwich construction, Solar panels, Space environmental conditions, aluminum, Mechanical properties, Tensile properties, Elasticity, Design, Cylindrical bodies.
Identifiers: Solar collectors, Self-rigidizing materials.

Properties obtainable by various techniques of curing polymer systems were evaluated and a resin system for the rigidization of expandable space structures was developed. Several fabrics which closely resembled a true honeycomb were used in the fabrication of the desired items. The final items of the development program were a lightweight, expandable, self-rigidizing 5 ft. diameter solar collector and a lightweight, expandable self-rigidizing 7 ft. diameter by 7 ft. high cylindrical space shelter. Both final items were rigidized by vapor phase catalysis of a chemical rigidizing resin system. The study revealed that it is feasible and even desirable to design, fabricate, and rigidize flexible, self-rigidizing solar collector and shelter for space application using a honeycomb type sandwich material as the basic structural material. (Author)
AD-440 225 HC$3.00

BEHAVIOR OF COMPRESSIVELY LOADED REINFORCING WIRES.
Stanford Research Inst Menlo Park Calif 0511
For primary bibliographic entry see Field 20K.
AD-650 617 HC$3.00 MF$0.65

ON THE IN-VACUO VIBRATIONS OF SIMPLY SUPPORTED RING-STIFFENED CYLINDRICAL SHELLS.
David Taylor Model Basin Washington D C Structural Mechanics Lab
Gerard D. Galletly. Feb 58, 10p
DTMB-1195
Availability: Published in Proceedings of the U. S. National Congress of Applied Mechanics (2nd), University of Michigan, Ann Arbor, Michigan, Jun 14-18, 1954.

Descriptors: (*Stiffened cylinders, Vibration), Vacuum, Structural shells, Rings, Stresses, Mathematical analysis, Reinforcing materials.

An analytical solution is presented for the problem of determining the in-vacuo frequencies of vibration of a simply supported thin cylindrical shell, which is reinforced by equally spaced, equal strength circular ring stiffeners. The displacement configuration assumed permits inter-ring deformation of the shell. Numerical calculations were made for a cylindrical shell with various sizes of stiffening rings and curves were plotted which show the effect of the rings upon the frequency of vibration. The numerical values obtained were also compared with those calculated by approximate methods and were found to agree within plus or minus 10 percent. (Author)
AD-650 699 Not available from CFSTI.

DURABILITY AND BEHAVIOR OF PRESTRESSED CONCRETE BEAMS. REPORT 2. POSTTENSIONED CONCRETE INVESTIGATION PROGRESS TO JULY 1966.
Technical rept.,
Army Engineer Waterways Experiment Station Vicksburg Miss
E. C. Rosnore. Mar 67, 41p Rept no. TR-6-570
Availability: Hard copy available from Army Engineer Waterways Experiment Station, Vicksburg, Miss., $0.75.

Descriptors: (*Beams (Structural), *Concrete), (*Anchors (Structural), *Sea water), Performance (Engineering), Tensile properties, Cements, Plasticity, Mixtures, Freezing, Cracks, Reinforcing materials.

The investigation was concerned with exposure testing of end anchorages and end-anchorage protection on posttensioned beams. The study consisted essentially of the fabrication and testing of 20 air-entrained posttensioned concrete beams and 280 auxiliary specimens. The auxiliary specimens were tested in the laboratory to determine the strength and plastic properties of the mixtures used. The 20 beams were installed at the Treat Island, Maine, exposure station in June 1961, where they are being subjected to freezing and thawing in sea water. After 5 winters of exposure, three of the 40 end-anchorage protections have become detached, one has become loose, and 15 have developed a crack at the bond line with the beam. It is concluded that: (a) concrete cover over reinforcing steel should be greater than 3/4 in. when exposure to sea water is involved; (b) differences among the four methods of end preparation of beams that received portland-cement concrete protection over external anchorages do not seem to be significant in the performance of the anchorage protection; (c) flush anchorages appear to have been more effectively protected than the external anchorages; and (d) epoxy concrete appears to be superior to portland-cement concrete for end protection.
AD-650 727 MF$0.65

ATTENUATION OF PEAKED AIR SHOCK WAVES IN SMOOTH TUNNELS.
Memorandum rept.,
Ballistic Research Labs Aberdeen Proving Ground Md
George A. Coulter. Nov 66, 84p Rept no. BRL-MR-1809

Descriptors: (*Shock waves, Attenuation), (*Shelters, *Underground structures), Design, Explosion effects, Ventilation ducts, Shock tubes, Pressure, Blast.

The attenuation of shock-front pressure for peaked air shock waves was measured along straight smooth-wall test sections of 1-, 2-, and 4-inch inside diameter shock tubes over travel distances up to 520-tunnel diameters. Shock overpressure between 50 and 450 psi for an ambient pressure of 1 atmosphere were produced by the use of helium or by burning M-9 propellant in the driver section of shock tubes. The lengths of the shock tube driver sections were changed to vary the shape of the shock waveform which caused the shock-front pressure to attenuate differently with distance. Pressure-time records are shown from piezoelectric pressure gages placed at ten test positions along the shock tube. (Author)
AD-650 741 HC$3.00 MF$0.65

STATIC AND DYNAMIC LABORATORY TESTS OF UNREINFORCED CONCRETE FIXED-END ARCHES BURIED IN DRY SAND.
Technical rept.,
Army Engineer Waterways Experiment Station Vicksburg Miss
George D. Meyer, and William J. Flathau. Feb 67, 131p Rept no. AEWES-TR-1-758
Research supported in part by DASA.
Availability: Hard copy available from Waterways Experiment Station, Vicksburg, Miss., HC$3.75.

Descriptors: (*Underground structures, Concrete), Convex bodies, Model tests, Loading (Mechanics), Sand, Pressure, Failure (Mechanics).

A study was made to determine the response of semicircular, unreinforced concrete, fixed-end arches of different stiffness buried in dense, dry sand when subjected to both static and dynamic loads. Two sets of three arches all having outside diameters of 12 inches were cast with one arch in each set having wall thicknesses of 1/2, 1, and 2 inches. The maximum static ground-surface overpressure applied was 550 psi, and the maximum dynamic overpressure was 270 psi. For most of the tests, the depth of sand over the crown of the

arch was 2 inches. The modes of response for the structures tested statically and dynamically were the same. However, only the 1/2-inch arch loaded statically collapsed. From strain measurements it was determined that the arches responded in compression. From the results, an equation, including the effects of soil arching, for predicting overpressures to cause failure of the type arches described in this report was developed. (Author)
AD-650 851 MF$0.65

A SURVEY OF THE METHOD OF INITIAL PARAMETERS.
Technical rept.,
IIT Research Inst Chicago Ill Mechanics Research Div
Walter D. Pilkey. Mar 67, 11p Rept no. IITRI-M6157-1
Contract N00014-66-C-0343

Descriptors: (*Structural parts, State-of-the-art reviews), (*Boundary value problems, Integral transforms), Linear systems, Elasticity, Functions, Bodies of revolution, Topology, Operators (Mathematics).

The method of initial parameters provides a universal, physically appealing solution for the static and dynamic response of such classical structural members as strings, bars, beams, frames, arches, membranes, plates, thick and thin shells. The state-of-the-art is reviewed for this technique which is known in either an analytical or numerical form to the mathematician as the set of fundamental solutions or the initial value approach to boundary value problems; to the electrical engineer as the state variable approach of transition matrices; to the structural engineer by the names: Cauchy, transfer matrix, Krilov, line solution, Clebsch, progression matrix, Macauley, transmission matrix, Holzer-Myklestad, eigenmatrix, Foppl, carryover matrix, Laplace transform, singularity function, Wilson, reduction, Hetenyi, initial function, Puzyrevskii-Krylov, and universal equation method. The distinguishing feature of the method is the treatment of a problem in terms of physical quantities (initial parameters or state variables) that are of direct concern to analysts and designers. In the execution of a solution these state variables are transferred along the member from one end to the other.
AD-650 912 HC$3.00 MF$0.65

DEVELOPMENT OF IMPROVED STRUCTURAL DYNAMIC ANALYSIS. VOLUME II. COMPUTER GRAPHICS.
Final rept., Jul-Nov 66,
Lockheed Missiles and Space Co Palo Alto Calif
Lockheed Palo Alto Research Lab
K. J. Forsberg, and S. K. Ferriera. Apr 67, 92p
Rept no. LMSC-L-30-66-2
AFFDL-TR-66-187-Vol-2
Contract AF 33 (615)-3131
See also AD-645 461.

Descriptors: (*Structural properties, Dynamics), (*Graphics, Computers), Analysis, Beams (Structural), Cathode ray tube screens.

The work is concerned with the application of a new tool (computer graphics) rather than the development of a new analytical technique. The problem of the dynamic response of a nonuniform beam was treated using the currently standard techniques of lumped mass-spring representation of the structure. A graphic input and output capability was attached to standard digital computer programs so that one can display on the face of a cathode ray tube the input parameters, modify these if desired, and then compute the modal behavior of the beam. The engineer can return to the initial input data, make changes, and rerun the program if he so desires. For the forced response problem, he can input his forcing functions, compute the forced response, and present the results in an animated display. This technique for communicating with the computer gives immediate reduction and interpretation of the results from the forced response program, a task which in the digital form requires many hours or even days. (Author)
AD-650 932 HC$3.00 MF$0.65

MANUAL OF DATA GATHERING PRACTICE RELATIVE TO THE REUSABILITY OF BUILDINGS AFTER A WARFIRE.
Lin (T Y) and Associates Van Nuys Calif 05
For primary bibliographic entry see Field 13L.
AD-651 009 HC$3.00 MF$0.65

TRIAL SURVEY AND ANALYSIS OF SEVERAL BUILDINGS RELATIVE TO THEIR REUSABILITY AFTER A WARFIRE.
Lin (T Y) and Associates Van Nuys Calif 05
For primary bibliographic entry see Field 13L.
AD-651 010 HC$3.00 MF$0.65

STEM SELF-EXTENSION VELOCITIES.
Toronto Univ (Ontario)
F. P. J. Rimrott. 25 Aug 66, 8p Rept no. Reprint-2742
Availability: Published in Canadian Aeronautics and Space Journal v13 n1 p1-7 Jan 1967.

Descriptors: (*Extendable structures, Pipes), Canada, Operation, Storage, Velocity, Force (Mechanics).
Identifiers: STEM.

The STEM has by now become an established machine element widely used in spacecraft and on the ground. In the paper the self-extension velocities of the various STEM configurations are derived by theory, and values for a typical STEM have been calculated and plotted, indicating order of magnitude and trend. The diagrams plotted are for the 0.9 in. diameter stainless steel STEM, one of the most common. (Author)
AD-651 030 Not available from CFSTI.

ELASTIC-PLASTIC RESPONSE OF STRUCTURES TO BLAST AND IMPULSE LOADS.
Technical rept.,
J G Engineering Research Associates Baltimore Md
Joshua E. Greenspon. Mar 67, 42p Rept no. TR-7
Contract DA-18-001-AMC-1019 (X)

Descriptors: (*Structural parts, *Blast), (*Failure (Mechanics), Structural parts), Beams (Structural), Structural shells, Cylindrical bodies, Panels (Structural), Structural properties, Airframes, Plasticity, Elasticity, Deformation, Dynamics, Damage.

The report discusses the general types of failures of typical structures that are used in aircraft and missiles. The theories of elastic and plastic deformation of these structures are presented and comparison with experiments of simple structures is given. It is found that the side on impulse can be used together with rigid-plastic theory of buckled and collapsed cylinders to predict plastic deformation for a wide range of pulse durations. For beam type structures the impulse and rigid plastic approximations seem to only hold for pulses of very short duration. (Author)
AD-651 051 HC$3.00 MF$0.65

DEVELOPMENT OF INFLATABLE FRAME FOR ARCTIC SURVIVAL SHELTER.
Final rept.
Schjeldahl (G T) Co Northfield Minn
25 Dec 66, 41p
Contract AF 41 (609)-2952
Supersedes AD-648 836.

Descriptors: (*Shelters, *Inflatable structures), Supports, Survival kits, Tents, Arctic regions, Materials, Cold weather tests, Pumps, Packaging, Nylon, Plastic coatings, Isocyanate plastics, Assembling, Costs.

A research and design program was undertaken for the fabrication of four inflatable frames and pumps, which are to be an integral part of an arctic shelter survival kit. A materials search was conducted for a suitable frame material which would be compatible with the intended shelter performance and environment requirements. A pump development program was also necessary. After selecting a frame material, four inflatable shelter frame assemblies were produced incorporating design changes found to be desirable or needed from an evaluation of the previous unit. In quantities of 10,000, a selling price of below $160 each is projected.
AD-651 058 HC$3.00 MF$0.65

MEASURING SURFACE IRREGULARITIES IN PANEL PRODUCTS.
Forest Products Lab Madison Wis
For primary bibliographic entry see Field 11L.
AD-651 125 HC$3.00 MF$0.65

MINIMUM WEIGHT DESIGN OF STRUCTURES.
Final rept., 1 Feb 64-31 Jan 67,
Illinois Inst of Tech Chicago Dept of Mechanics
George J. Megarefs. 1967, 13p
AROD-4551:7-E
Contract DA-31-124-ARO (D)-185
See also AD-646 153.

Descriptors: (*Panels (Structural), Design), (*Structures, Weight), Volume, Sheets, Optimization, Sandwich panels, Statistical analysis, Structural properties, Reviews.

When the proposal for the contract reviewed herein was submitted, it was expected that most of the time and effort would be spent in developing practical and approximate methods for determining the minimum volume design of complicated frames and other structures. It was however indicated in the proposal that priority would be given to some questions in the minimum volume design of axisymmetric plates, because of their fundamental importance. In answering these questions, it soon transpired that the possibility was created for obtaining exact solutions for a wide range of problems of axisymmetric plates and shells, which had not been previously attacked or which could now be treated in greater generality. As a result most of the time and effort during the period covered by the present report was devoted to obtaining exact solutions of the minimum volume design of axisymmetric plates. (Author)
AD-651 139 HC$3.00 MF$0.65

BUILDINGS WITH FALLOUT SHELTER.
Office of Civil Defense Washington D C 0900
Jul 66, 57p Rept no. OCD-TR-37
Prepared in cooperation with Department of Defense, Washington, D. C.
Availability: Hard copy available from USA Publication Center, Civil Defense Branch, 2800 Eastern Blvd. (Middle River), Baltimore, Md. 21220.

Descriptors: (*Fallout shelters, *Civil defense systems), (*Buildings, Shielding), Nuclear explosion damage, Nuclear radiation, Construction, Costs, Nuclear warfare.

The booklet contains descriptions, photographs, drawings and cost analyses of various types of new buildings with built-in fallout protection. Architects and engineers knowledgeable in shielding techniques can incorporate the additional fallout protection for little, if any, increase in cost, whether the building is a school, bank, library, church, dormitory, office building, industrial facility or home for the aged. The shielding techniques are

applicable to all types of buildings. The projects shown here are attractive and contain fallout shelter in aboveground as well as belowground locations. The shelter areas are in continuous use as part of the normal building function and have been provided without adversely affecting the cost or appearance.
AD-651 182 MF$0.65

SOLUTION OF A CIRCULAR RING STRUCTURAL PROBLEM.
Technical rept.,
Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
Houston D. McGinness. 1 Nov 61. 13p TR-32-178
Contract NASw-6

Descriptors: (*Geometric forms, *Structural properties), (*Mathematical analysis, *Torsion), Moments, Deflection, Shear stresses, Elasticity, Equations, Tables.

Formulae for calculating the vertical shear, bending moment, torsion, and deflection at midspan are presented for the case of an endless circular ring of constant cross section which is held by N frictionless supports and symmetrically loaded by N concentrated forces and/or a uniformly distributed load, both of which act normal to the plane of the ring. (Author)
N65-82307 HC$3.00 MF$0.65

STRUCTURAL ANALYSIS AND MATRIX INTERPRETIVE SYSTEM (SAMIS) PROGRAM REPORT TECHNICAL MEMORANDUM, FEB. 1963 - DEC. 1965.
Philco Corp., Palo Alto, Calif. Western Development Labs.
For primary bibliographic entry see Field 9B.
For abstract, see STAR 05 11.
N67-22062 HC$3.00 MF$0.65

STRUCTURAL ANALYSIS AND MATRIX INTERPRETIVE SYSTEM (SAMIS) PROGRAM TECHNICAL REPORT, FEB. - AUG. 1966.
Philco Corp., Palo Alto, Calif. Western Development Labs.
For primary bibliographic entry see Field 9B.
For abstract, see STAR 05 11.
N67-22063 HC$3.00 MF$0.65

FINITE ELEMENT MODELING OF A CIRCULAR RING USING HALF AND QUARTER SYMMETRY.
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
W. L. Cook. Dec 66, 22p NASA-TM-X-55746, X-321-66-587

Descriptors: *Circle, *Mathematical model, *Mode shape, *Ring structure, Element, Finite, Frequency, Half, Mathematics, Mode, Model, Quarter, Ring, Shape, Structure, Symmetry, Technique.

For abstract, see STAR 05 11.
N67-23317 HC$3.00 MF$0.65

DYNAMICS OF FLEXIBLY SUPPORTED TUNNELS AND OTHER ROADBEDS.
Massachusetts Inst. of Tech., Cambridge. Engineering Projects Lab.
Forbes T. Brown. 1 Nov 66, 31p DSR-76107-1
Contract C-85-65

Descriptors: (*Underground structures, Flexible structures), (*Flexible structures, *Railroad tracks), Dynamics, Loading (Mechanics), Vibration, Acceleration, Velocity, Railroads.

Vehicles supported by flexible roadbeds can exhibit violent vibrations near a particular critical velocity. This situation is idealized to a concentrated load traveling on a Bernoulli-Euler beam which rests on an elastic foundation. A floating tunnel design of the type proposed by Edwards is so modeled, and found to have a critical velocity of about 262 miles per hour and nearly negligible damping. Avoidance of excessive vibration by rapidly accelerating or deceleration through the critical frequency is studied with preliminary results. The tentative indication on the particular example is that an impractically high acceleration would be necessary unless changes are made. (Author)
PB-173 645 HC$3.00 MF$0.65

ETUDE EXPERIMENTALE DE PLAQUES MINCES CARREES ET ENCASTREES SUR LEURS QUATRE RIVES (PLAFONDS DE CAISSONS ETANCHES) (Experimental Study of Thin Square Slabs, Embedded on all Four Sides (Pressure Vessel Floors)),
Commissariat a l'Energie Atomique, Fontenay-Aux-Roses (France). Centre d'Etudes Nucleaires.
For primary bibliographic entry see Field 18I.
PB-174 577 HC$3.00 MF$0.65

14. METHODS AND EQUIPMENT

14A. COST EFFECTIVENESS

SOME NETWORK CHARACTERIZATIONS FOR MATHEMATICAL PROGRAMMING AND ACCOUNTING APPROACHES TO PLANNING AND CONTROL.
Carnegie Inst of Tech Pittsburgh Pa Management Sciences Research Group
For primary bibliographic entry see Field 5A.
AD-650 613 Not available from CFSTI.

A STUDY TO DETERMINE THE FEASIBILITY OF DEFINING EARTHMOVING VEHICLE SYSTEMS BY ANALYTICAL TECHNIQUES.
General Motors Corp Cleveland Ohio Allison Div
For primary bibliographic entry see Field 13C.
AD-650 764 HC$3.00 MF$0.65

OPTIMAL CONTINUOUS REVIEW POLICIES FOR TWO PRODUCT INVENTORY SYSTEMS WITH JOINT SETUP COSTS.
Columbia Univ New York Operations Research Group
For primary bibliographic entry see Field 5A.
AD-650 793 HC$3.00 MF$0.65

BIBLIOGRAPHY ON COST-BENEFIT ANALYSIS AND PLANNING-PROGRAMMING-BUDGETING.
Research Analysis Corp Mclean Va
For primary bibliographic entry see Field 5A.
AD-650 904 HC$3.00 MF$0.65

QUANTIFICATION OF PERSONNEL PERFORMANCE FOR COST EFFECTIVENESS DECISIONS: I. AN ANNOTATED BIBLIOGRAPHY.
Naval Personnel Research Activity San Diego Calif
For primary bibliographic entry see Field 5I.
AD-650 933 HC$3.00 MF$0.65

14B. LABORATORIES, TEST FACILITIES, AND TEST EQUIPMENT

THE CURRENT PROBE A NEW DEVICE IN THE FIELD OF RADIO INTERFERENCE MEASUREMENT.
Technical rept.,
Army Electronics Labs., Fort Monmouth, N. J. Horst E. Ulfers. 15 Sep 60, 26p USAEL-TR-2146

Descriptors: (*Probes (Electromagnetic), Radiofrequency interference), Measurement.

Rf current probes can be very useful in measuring radio frequency interference. The report shows simple measures for extending the frequency range of commercial probes. (Author)
AD-249 904 HC$3.00

INHERENT LIMITATIONS OF ACCELEROMETERS FOR HIGH-FREQUENCY VIBRATION MEASUREMENTS.
Research and development rept.,
David Taylor Model Basin Washington D C Hydromechanics Lab
Fred Schloss. Jan 63, 7p
DTMB-1698
Availability: Published in Journal Acoustical Society of America v33 n4 7p Apr 1961.

Descriptors: (*Accelerometers, Calibration), (*Structures, Vibration), High frequency, Measurement, Transducers.

A transducer attached to a structure affects the motion of the structure, thus imposing an upper frequency limit at which valid measurements and calibrations can be made. The effect on calibration is presented as well as theoretical calculations for a typical accelerometer attached to plates and lumped masses. (Author)
AD-650 561 Not available from CFSTI.

THE DETERMINATION OF DIRECTIONAL WAVE SPECTRA IN THE TMB MANEUVERING-SEAKEEPING BASIN.
Research and development rept.,
David Taylor Model Basin Washington D C Hydromechanics Lab
W. E. Cummins. Jul 59, 23p
DTMB-1362
Prepared for presentation at the American Towing Tank Conference (12th) at the University of California, Berkeley, California, September 1959.

Descriptors: (*Water waves, Spectroscopy), (*Model basins, Test methods), Measurement, Maneuverability, Ship models, Probes, Determination, Optimization.

The method for measurement of directional spectra makes use of a linear array of wave-height probes supported on a rotatable beam. For each orientation of the array, the spectrum along a line perpendicular to that orientation can be determined. A nonuniform arrangement of the wave probes along the beam is given which optimizes the directional selectivity of the array. (Author)
AD-650 604 HC$3.00 MF$0.65

TECHNIQUES FOR SIMULATING THE HYDRODYNAMIC FORCES ON SONAR DOMES BY STATIC LOADS.
David Taylor Model Basin Washington D C Structural Mechanics Lab
For primary bibliographic entry see Field 17A.
AD-650 635 HC$3.00 MF$0.65

ON THE SIGNIFICANCE OF THE SUPPORTS WHEN CALIBRATING STRAIN GAUGE INSTALLATIONS FOR MEASURING LOADS ON AIRCRAFT.
Royal Aircraft Establishment Farnborough (England)
For primary bibliographic entry see Field 1C.
AD-650 672 HC$3.00 MF$0.65

PROPULSION SHAFT CALIBRATION FOR TORSIONAL MODULUS OF RIGIDITY.

David Taylor Model Basin Washington D C Hydromechanics Lab
For primary bibliographic entry see Field 13J.
AD-650 693 HC$3.00 MF$0.65

EXPERIMENTAL TECHNIQUES FOR MEASURING VIBRATIONS USING A LASER INTERFEROMETER.
Navy Marine Engineering Lab Annapolis Md
For primary bibliographic entry see Field 20F.
AD-650 720 HC$3.00 MF$0.65

DIFFERENTIAL ULTRASONIC SPECTROSCOPY FOR DEFECT AND MICROSTRUCTURE IDENTIFICATION.
Technical rept.,
Army Materials Research Agency Watertown Mass
Otto R. Gericke. Mar 67, 19p Rept no. AMRA-TR-67-07

Descriptors: (*Non-destructive testing, Ultrasonic radiation), (*Spectrum analyzers, Ultrasonic radiation), Microstructure, Defects (Materials), Pulse height analyzers.

The report presents improved experimental procedures for ultrasonic spectroscopy which make it possible either to compare the spectra of two ultrasonic echo signals or to obtain a curve representing differences in the spectral amplitude distribution of these signals. It is shown that the differential method can be used to distinguish two defects from each other which, although differing in size, produce indications of identical height in an ordinary pulse-echo test. It is further shown that the new spectroscopic technique can be used to determine differences in the microstructure of materials if these differences affect the attenuation of ultrasound. (Author)
AD-650 787 HC$3.00 MF$0.65

EVALUATION OF LORAN A AND C SIMULATOR.
National Aviation Facilities Experimental Center Atlantic City N J
For primary bibliographic entry see Field 17G.
AD-650 811 HC$3.00 MF$0.65

SOME ASPECTS OF THERMAL MODEL TESTING IN SPACE CHAMBERS.
Arnold Engineering Development Center Arnold Air Force Station Tenn
For primary bibliographic entry see Field 22B.
AD-650 814 HC$3.00 MF$0.65

INSTRUMENTATION DEVELOPMENT PROGRAM.
Arnold Engineering Development Center Arnold Air Force Station Tenn
For primary bibliographic entry see Field 21C.
AD-650 857 HC$3.00 MF$0.65

PRESSURE MEASUREMENT IN THE 0.0001 TO 0.0000001 TORR RANGE,
Air Force Flight Dynamics Lab Wright-Patterson AFB Ohio
Vernon L. Mangold. Dec 66, 25p Rept no. AFFDL-TR-66-190

Descriptors: (*Vacuum, Measurement), (*Pressure gages, Accuracy), Low-pressure research, Instrumentation, Calibration, Ionization gages, Standards.

The report describes the results of an experimental program to establish the accuracy of pressure measurement in the 0.0001 to 0.0000001 torr range using a 'calibrated conductance-type pressure measurement system'. The data collected during the study is discussed and tabulated. Results of the study indicate that the calibrated conductance-type measurement system investigated can be considered as a standard-type calibration device for the pressure range of 0.0001 to 0.0000001 torr with a maximum uncertainty of 10.3 percent. The difference between the system pressure calculated from measured conditions and a calibrated (McLeod) ion gauge was found to be 3.7 percent maximum in the range 0.00001 to 0.0000001 torr. (Author)
AD-650 914 HC$3.00 MF$0.65

A LOW-FREQUENCY THERMAL FOLLOW BRIDGE FOR MEASURING THE ELECTRO-THERMAL PARAMETERS OF BRIDGEWIRES,
Naval Ordnance Lab White Oak Md Explosion Dynamics Div
For primary bibliographic entry see Field 19A.
AD-650 963 HC$3.00 MF$0.65

MULTI-CORE MEMORY MODULE DC TESTER,
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
For primary bibliographic entry see Field 9B.
AD-650 978 HC$3.00 MF$0.65

MULTI-CORE ASSEMBLY AUTOMATIC TEST PROGRAM,
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
For primary bibliographic entry see Field 9B.
AD-650 993 HC$3.00 MF$0.65

FEASIBILITY OF A HIGH PERFORMANCE AERODYNAMIC IMPULSE FACILITY.
Final rept.,
Avco Everett Research Lab Everett Mass 2207
R. Leon Leonard, and Peter H. Rose. Dec 66, 76p AFFDL-TR-66-139
Contract AF 33 (615)-3074
Report on project Experimental Simulation of Flight Mechanics.

Descriptors: (*Shock tubes, Feasibility studies), Aerodynamics, Performance (Engineering), Reynolds number, Mach number, Energy, Magnetohydrodynamic generators, Gas flow, Enthalpy, Design.

A study was conducted to ascertain the feasibility of a high performance aerodynamic impulse facility capable of producing a high velocity and high Reynolds number environment. Of many facilities considered, those most promising were magnetic annular arc tunnels and expansion tubes as single stage techniques, and a shock tunnel driving a j x B accelerator as a two stage technique. Experimental performance of the Magnetic Annular Arc (a new device for this application) implies that it can achieve the environment considered, but research directed more specifically to this goal must be performed. The expansion tube can theoretically achieve the conditions required, but experimental results indicate the prohibitive lengths and energies above 10 to the 8th power joules will be required to achieve the times necessary for aerodynamic testing. The shock tunnel driving a j x B accelerator necessary to achieve the environment will be physically large and consequently require above 10 to the 8th power joules energy, but experiments thus far indicate no limitations which will prevent attainment of the desired environment. (Author)
AD-651 042 HC$3.00 MF$0.65

COMPARATIVE RESISTANCE TESTS WITH ATTC STANDARD MODEL,
David Taylor Model Basin Washington D C 0900
For primary bibliographic entry see Field 13J.
AD-651 094 HC$3.00 MF$0.65

ELECTROMAGNETIC MEASUREMENTS OF ACCELERATION.
Utah Univ Salt Lake City Upper Air Research Labs
For primary bibliographic entry see Field 20N.
AD-651 161 HC$3.00 MF$0.65

THE AMICOM PLASMA DRIVEN SHROUD WIND TUNNEL (DESIGN AND CONSTRUCTION REPORT),
Army Missile Command Redstone Arsenal Ala Physical Sciences Lab
T. A. Barr, Jr. 18 Oct 65, 33p Rept no. RR-TN-65-3

Descriptors: (*Wind tunnels, Design), (*Guided missile components, Loading (Mechanics)), Shear stresses, Aerodynamic heating, Plasma generators, Construction, Nose cones, Wind tunnel nozzles, Shroud rings.

The AMICOM Plasma Driven Shroud Wind Tunnel is being constructed to give simultaneously the heating and shearing loads on missile components (e.g. nose cones, fins, etc.) in the following flight regime: $5 < M < 10$, and altitude $< 20{,}000$ feet. The shroud technique is to be used. The requirements and procedures used to design and construct the shroud system are described. The system features six plasma generators; copper lined, heat sink plenum; auxiliary air injection; and replaceable nozzles and shrouds. Maximum capabilities are calculated in terms of the plenum conditions. These plenum conditions are plenum pressure $<$ 1500 psi and plenum temperature $<$ 3800K. Operating times are no more than 4 seconds. (Author)
AD-651 187 HC$3.00 MF$0.65

REMOTE SENSING BY INFRARED AND MICROWAVE RADIOMETRY. I. BASIC PRINCIPLES. II. A TECHNIQUE FOR THE CORRECTION OF AIRBORNE MEASUREMENTS OF APPARENT SURFACE TEMPERATURE OF NATURAL WATER BODIES. III. POTENTIAL APPLICATIONS OF INFRARED AND MICROWAVE RADIOMETRY.
Technical rept.,
Wisconsin Univ Madison Dept of Meteorology
Velayudh Krishna Menon, and Robert A. Ragotzkie. Feb 67, 66p Rept no. TR-31
Contract Nonr-1202 (07)

Descriptors: (*Radiometers, Operation), (*Infrared optical systems, Sensors), (*Microwave equipment, Sensors), Thermal radiation, Blackbody radiation, Emissivity, Atmosphere, Water vapor, Wave transmission, Carbon dioxide, Water, Surface temperatures, Airborne, Oceanology, Atmospheric temperature, Cloud cover.

The basic principles involved in the remote sensing by passive techniques in the infrared to microwave region of the electromagnetic spectrum are discussed. Whereas the radiation below ten micron wavelength has found distinct application in many fields, the region between 0.1 to 10 cms has a decided advantage in situations where the atmospheric constituents interfere. Consideration is then given to the specific problem of atmospheric interference in the 8 to 14 micron wavelength region due to water vapor and carbon diozide. A technique for correcting radiometric measurements of surface temperatures for interference by these two constituents is suggested. The final portion deals with the potential applications of infrared and microwave radiometry to the measurement of surface temperature of natural water bodies, horizontal temperature gradients, and the heat flux across the sea-air interface. The relative advantages of infrared and microwave techniques are compared. (Author)
AD-651 188 HC$3.00 MF$0.65

STUDY OF SOLUTION DEOXYGENATION AND SPECIMEN PRETREATMENT TECHNIQUES

FOR USE IN THE HYDROGEN PERMEATION APPARATUS.
Naval Air Engineering Center Philadelphia Pa Aeronautical Materials Lab
For primary bibliographic entry see Field 11F.
AD-651 211 HC$3.00 MF$0.65

A MAGNETIC ANNULAR ARC DRIVEN SHOCK TYPE.
Research rept.,
Avco Everett Research Lab., Everett, Mass.
A. M. Schneiderman, E. R. Pugh, and R. M. Patrick.Jan 67, 52p AERL-RR-263
Contract AF 49 (638)-1483

Descriptors: (*Shock tubes, Electric arcs), Electromagnets, Magnetic fields, Voltage, Anodes, Heat transfer, Shock waves, Thermal radiation, Helium, Plasma medium.

The production of high speed shocks in shock tubes has been limited to levels below 1.3 CM/microsec by excessive radiation from the initially stagnant arc heated driver gas. This limitation can be removed by adding the required energy to a flowing driver gas in a device in which the static temperature is maintained at a sufficiently low level to keep the radiation losses small. It is shown that the only prerequisite for such a device is that it is capable of adding the required energy to a mass flow of driver gas sufficiently large as to keep the static temperature low. The magnetic annular arc (MAARC) has demonstrated such capabilities in applications for space propulsion and solar wind simulation. Based on this past experience, a MAARC driver has been constructed and tested on a 1-1/2 in. shock tube. The MAARC was operated at an average power level equal to 200 MW for 50 Microsec at a voltage of 1 KV. Helium was used as the driver gas and shock speeds in excess of 2 CM/Microsec were obtained in air. Several measurements were made to determine the test time which was found to be approximately 5 microsec at the above conditions. This figure agrees with what is to be expected from theoretical considerations. (Author)
AD-807 719 HC$3.00 MF$0.65

THERMAL RADIATION PROPERTY MEASUREMENT TECHNIQUES.
Technical note,
National Bureau of Standards, Washington, D. C. Inst. for Basic Standards.
S. T. Dunn, J. C. Geist, D. G. Moore, H. E. Clark, and J. C. Richmond.27 Apr 67, 84p
Hardcopy available from Superintendent of Documents, GPO, Washington, D. C., 20402 $0.50.

Descriptors: (*Thermal radiation, Measurement), Thermal properties, Test methods, Cylindrical bodies, Test equipment, Calibration, Reflectometers, Interferometers, Spectrometers, Surface roughness, Reflectivity, Standards.

The work comprised (1) completion of the development and calibration of a rotating cylinder procedure for measuring normal spectral emittance of non-conducting materials at temperatures in the range of 1200 to 1600K, (2) analysis and calibration of an elipsoidal mirror reflectometer, and (3) a study of the relation between surface roughness and geometric distribution of flux reflected from a surface. (Author)
NBS-TN-415 HC$0.50 MF$0.65

RADIOMETRY RESEARCH.
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
Mar 67, 327p NASA-TM-X-55735, X-713-67-73

Descriptors: *Plasma arc, *Protective coating, *Solar cell, *Solar simulation, *Spectral analysis, *Temperature control, Analysis, Arc, Calibration, Cell, Coating, Control, Distribution, Energy, Experiment, Flux, Measurement, Plasma, Protection, Shock, Simulation, Solar, Spacecraft, Spectral, Stability, Temperature, Testing, Vacuum, Vortex.

For abstract, see STAR 05 11.
N67-22141 HC$3.00 MF$0.65

FEASIBILITY STUDY OF AN EXPLOSIVE GUN.
Stanford Research Inst., Menlo Park, Calif.
J. K. Crosby, and S. P. Gill. Apr 67, 102p NASA-CR-709
Contract NAS2-1361

Descriptors: *Explosive, *Gas gun, *Gun launching device, Acceleration, Code, Component, Computer, Detonation, Dynamics, Feasibility, High performance, Light, Operation, Projectile, Velocity.

For abstract, see STAR 05 11.
N67-22150 HC$3.00 MF$0.65

SPACE ENVIRONMENTS - THEIR EFFECTS ON SPACECRAFT DESIGN.
European Space Technology Center, Noordwijk (Netherlands).
For primary bibliographic entry see Field 20B.
For abstract, see STAR 05 11.
N67-22500 HC$3.00 MF$0.65

VACUUM CONDITIONS AND THEIR ATTAINMENT IN THE LABORATORY.
European Space Technology Center, Noordwijk (Netherlands).
J. H. Makkink. Nov 66, 78p ESRO-TM-48
Presented At the Esro Summer School, Oxford, 12 Aug. 1964

Descriptors: *Gaseous diffusion, *Pressure measurement, *Pump, *Sorption, *Vacuum system, Booster, Carbon, Conductivity, Cryopumping, Detection, Diffusion, Evaporation, Gaseous, Gauge, Getter, Heat, Ionization, Kinetic, Leakage, Low pressure, Manometer, Mass, Material, Mcleod gauge, Measurement, Molecular, Oil, Penning gauge, Pressure, Spacecraft, Spectrometer, System, Theory, Vacuum.

For abstract, see STAR 05 11.
N67-22503 HC$3.00 MF$0.65

SURVEY OF DETECTORS AND DYNAMIC CALIBRATION METHODS FOR REMOTE SENSING SYSTEMS.
IIT Research Inst., Chicago, Ill.
For primary bibliographic entry see Field 14C.
For abstract, see STAR 05 11.
N67-22779 HC$3.00 MF$0.65

THE STABILITY OF A WIND TUNNEL MODEL ON FLEXIBLE SUPPORTS.
Royal Aircraft Establishment, Farnborough (England).
W. G. Molyneux. Feb 64, 38p RAE-TN-STRUCT-348
Presented At the Von Karman Inst. for Fluid Dyn., Belgium, May 1964

Descriptors: *Flexibility, *Rigid body, *Stability, *Wind tunnel model, Binary, Body, Freedom, Interference, Mode, Model, Oscillation, Rigid, Roll, Rotation, Support, System, Tunnel, Wind, Yaw.

For abstract, see STAR 05 11.
N67-22783 HC$3.00 MF$0.65

A CLASS ' A' D.C. COUPLED POWER AMPLIFIER.
Royal Aircraft Establishment, Farnborough (England).
For primary bibliographic entry see Field 9E.
For abstract, see STAR 05 11.
N67-22923 HC$3.00 MF$0.65

ROTATING CRYSTAL SPECTROMETERS WITH AND WITHOUT AN AUXILIARY DEVICE FOR SUPPRESSION OF UNWANTED REFLEXIONS.
Oesterreichische Studiengesellschaft Fuer Atomenergie G.M.B.H., Seibersdorf.
E. Legler, and G. Quittner. 1966, 24p SGAE-PH-48/1966
Submitted for Publication Sponsored in Part By U.S. Gov't

Descriptors: *Chopper, *Spectrometer, Background, Crystal, Design, Energy, Intensity, Reduction, Rotation.

For abstract, see STAR 05 11.
N67-22980 HC$3.00 MF$0.65

A DISTRIBUTION SYSTEM FOR A MULTICHANNEL HIGH FREQUENCY IMPULSE ANALYZER.
Ein Ausgabesystem Fuer Einen Vielkanal- Impulshoehen-analysator
Kernforschungsanlage, Juelich (West Germany). Inst. Fuer Reaktorbauelemente.
L. Jung, and G. Riepe. May 65, 23p JUL-270-RB in German

Descriptors: *Electronic recording instrument, *Spectral energy distribution, *Spectrograph, Cesium, Channel, Crystal, Digital, Distribution, Electronic, Energy, Impulse, Multiple, Peak, Photomultiplier, Quantity, Readout, Receiver, Recording instrument, Spectral, Spectrum, Voltage.

For abstract, see STAR 05 11.
N67-23035 HC$3.00 MF$0.65

AUTOMATICALLY CONTROLLED AIR SPRING SUSPENSION SYSTEM FOR VIBRATION TESTING.
National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
G. V. Dixon, and J. Pearson. Apr 67, 40p NASA-TN-D-3891
Contract 124-11-05-13-23

Descriptors: *Automatic control, *Suspension system, *Test equipment, *Vibration testing, Air, Automatic, Control, Damping, Equipment, Launch vehicle, Low frequency, Mass, Propellant, Spring, Suspension, System, Tank, Test, Testing, Vibration.

For abstract, see STAR 05 11.
N67-23287 HC$3.00 MF$0.65

SEMIAUTOMATIC PREPARATION OF SPECIMENS FOR TRANSMISSION ELECTRON MICROSCOPY.
Oak Ridge National Lab., Tenn.
C. K. H. Dubose.Feb 67, 35p
Contract W-7405-eng-26

Descriptors: (*Electron microscopy, Light transmission), (*Electrolytic polishing, Detection), Nuclear radiation.

For abstract, see NSA 21 09.
ORNL-4066 HC$3.00 MF$0.65

REPORT OF NRL PROGRESS.
Naval Research Lab., Washington, D. C.
Apr 67, 50p
Also available on annual subscription from CFSTI $15.00 ($18.00 foreign).

Descriptors: (*Naval research laboratories, Reports), Scientific research, Nuclear reactions, Electron microscopy, Photography, Optical analysis, Radar, Underwater sound, Radio transmission, Metallurgy.

Content: Articles; Comparison of Neutron Flex Values Obtained by Simultaneous Irradia on of Fission and Threshold Monitors; Airglow Horizon Photography from the Gemini Spacecraft; Scientific Program; Mechanics; Metallurgy and Ceramics; Nuclear and Atomic Physics; Optical Physics; Radar; Sound. (Author)
PB-174 485 HC$3.00 MF$0.65

MICROWAVE SIGNAL SOURCE POLARAD 1206 1.95 TO 4.20 GHz.
Technical manual instrument calibration procedure, GG-25.
Bureau of Naval Weapons Representative, Pomona, Calif. Metrology Engineering Center.
15 Feb 67, 14p
NAVAIR-17-20GG-25

Descriptors: (*Calibration, *Signal generators), Instruction manuals, Test equipment (Electronics), Test methods, Microwave equipment.

The procedure describes the calibration of the Polarad 1206 microwave signal source. The procedure was prepared by the Metrology Engineering Center, NAVPLANTREP Pomona. (Author)
PB-174 525 HC$3.00 MF$0.65

MICROWAVE SIGNAL SOURCE POLARAD 1205 0.95 TO 2.40 GHz.
Technical manual instrument calibration procedure, GG-24.
Bureau of Naval Weapons Representative, Pomona, Calif. Metrology Engineering Center.
15 Feb 67, 15p
NAVAIR-17-20GG-24

Descriptors: (*Calibration, *Signal generators), Instruction manuals, Test equipment (Electronics), Test methods, Microwave equipment.

The procedure describes the calibration of the Polarad 1205 microwave signal source. The procedure was prepared by the Metrology Engineering Center, NAVPLANTREP Pomona. (Author)
PB-174 526 HC$3.00 MF$0.65

MICROWAVE SIGNAL SOURCE POLARAD 1207 3.8 TO 8.2 GHz.
Technical manual instrument calibration procedure, GG-26.
Bureau of Naval Weapons Representative, Pomona, Calif. Metrology Engineering Center.
15 Feb 67, 16p
NAVAIR-17-20GG-26

Descriptors: (*Calibration, *Signal generators), Instruction manuals, Test equipment (Electronics), Test methods, Microwave equipment.

The procedure describes the calibration of the Polarad 1207 microwave signal source. The procedure was prepared by the Metrology Engineering Center, NAVPLANTREP, Pomona. (Author)
PB-174 527 HC$3.00 MF$0.65

PORTABLE PRESSURE CALIBRATION SYSTEM MODEL 3460 (KING NUTRONICS CORPORATION).
Technical manual instrument calibration procedure, MP-15.
Bureau of Naval Weapons Representative, Pomona, Calif. Metrology Engineering Center.
15 Feb 67, 35p
NAVAIR-17-20MP-15

Descriptors: (*Calibration, *Pressure gages), Instruction manuals, Test equipment (Electronics), Test methods, Microwave equipment.

The procedure describes the calibration of the King Nutronics Corporation 3460 portable pressure calibration system. The calibration system consists of a pressure control/amplifying unit, a supply cylinder, a set of master gages, a set of fluid separators, and accessory equipment required to perform in-place calibration of pressure instrumentation. The procedure was prepared by the Metrology Engineering Center, Pomona, California. (Author)
PB-174 528 HC$3.00 MF$0.65

MICROWAVE SIGNAL SOURCE POLARAD 1208 7.0 TO 11.0 GHz.
Technical manual instrument calibration procedure, GG-27.
Bureau of Naval Weapons Representative, Pomona, Calif. Metrology Engineering Center.
15 Feb 67, 16p
NAVAIR-17-20GG-27

Descriptors: (*Calibration, *Signal generators), Instruction manuals, Test equipment (Electronics), Test methods, Microwave equipment.

The procedure describes the calibration of the Polarad 1208 microwave signal source. The procedure was prepared by the Metrology Engineering Center, NAVPLANTREP, Pomona. (Author)
PB-174 529 HC$3.00 MF$0.65

SIGNAL GENERATOR SG-691/ASA-48.
Technical manual calibration procedures.
Naval Air Systems Command, Washington, D. C.
15 Oct 66, 40p NAVAIR-17-20SEA-1

Descriptors: (*Calibration, *Signal generators), Instruction manuals, Test equipment (Electronics), Test methods.

The procedure describes the calibration of Signal Generator SG-691/ASA-48, Part No. 128SEAV10604-1, manufactured for the Grumman Aircraft Engineering Co., by Epsco, Inc. The Epsco Part No. is A740-2. (Author)
PB-174 541 HC$3.00 MF$0.65

OPTIMISATION DES DESCENTES DE COURANT DANS DES ENCEINTES CRYOGENIQUES (Optimum Input Leads for Cryogenic Apparatus),
Commissariat a l'Energie Atomique, Saclay (France). Centre d'Etudes Nucleaires.
Gerard der Nigohossian. Feb 67, 122p CEA-R-3167
Text in French.

Descriptors: (*Cryogenics, Instrumentation), (*Cryostats, *Electric connectors), Electric terminals, Thermal conductivity, Heating, Electrical conductance, Heat transfer, Materials, Copper, Aluminum, Brass, Stainless steel.

The electrical leads used to introduce a current into a cryostat cause a heat influx due to thermal conduction and to Joule heating. It is very important to be able to minimize this flux. Theoretical calculation of optimized leads takes into account the varying heat and electrical conductivities of the leads as well as the heat exchange coefficient with the effluent gas. Practical results are summarized in various tables which permit for a specific material i.e. copper, aluminium, brass, stainless steel with the intensity and end temperatures being known (i.e 4.2 or 18.5K at the cold end; 77.295 or 320K at the warm end) to deduce the minimum heat flow and the length-cross section ratio of the optimized leads. A general method is indicated, which permits the solution of the same problem for other materials. (Author)
PB-174 579 HC$3.00 MF$0.65

DIFFERENTIAL VOLTMETERS, JOHN FLUKE 801, 801IA, 801R, 801B, 801B/Ag, 801BR, 801BR/AG, 801H, 801H/G, 803, 803R, 803B, 803B/AF, 803/AG, 803BR and 803BR/AG.
Technical manual instrument calibration procedure, AE-26.
Naval Air Systems Command, Washington, D. C.
1 Feb 67, 44p NAVAIR-17-20AE-26
Supersedes PB-181 151 and PB-181 150.

Descriptors: (*Calibration, *Voltmeters), Instruction manuals, Test equipment (Electronics), Test methods, Navy.

The procedure describes the calibration of the John Fluke 801, 801IA, 801R, 801B, 801B/AG, 801BR, 801BR/AG, 801H, and 801H/G DC differential voltmeters, and the 803, 803B, 803R, 803BR, 803B/AF, 803B/AG, and 803BR/AG DC-AC differential voltmeters. The Test Instrument operates on the basic principle of comparing an unknown voltage with a precisely known voltage, and any difference between the two is indicated on a sensitive null detector. (Author)
PB-174 582 HC$3.00 MF$0.65

DIFFERENTIAL VOLTMETERS FLUKE 800 AND 800R.
Technical manual instrument calibration procedure, AE-45.
Bureau of Naval Weapons Representative, Pomona, Calif. Metrology Engineering Center.
1 Mar 67, 12p
NAVAIR-17-20AE-45

Descriptors: (*Calibration, *Voltmeters), Instruction manuals, Test equipment (Electronics), Test methods, Navy.

The procedure describes the calibration of the John Fluke 800 and 800R differential voltmeters. The TI consists of a highly stable direct voltage reference supply of exactly 500 volts, a precision 5-dial Kelvin-Varley divider for accurately selecting a known portion of the 500-volt reference voltage, and a multi-range EVM which is used either as a conventional EVM to determine the approximate value of the input voltage, or as a null detector for measuring the difference between the input voltage and a portion of the internal reference voltage. (Author)
PB-174 583 HC$3.00 MF$0.65

SIGNAL GENERATOR SG-47/USM-16 BYRON JACKSON 75.
Technical manual instrument calibration procedure, AG-92.
Lockheed Electronics Co., Clark, N. J.
1 Feb 67, 38p
NAVAIR-17-20AG-92
Contract N123 (62861)51296A

Descriptors: (*Calibration, *Signal generators), Instruction manuals, Test equipment (Electronics), Test methods, Portable, Navy.

The procedure describes the calibration of the SG-47/USM-16 signal generator, or its commercial equivalent the Byron Jackson model 75. The Test Instrument is a portable multi-purpose signal generator. It is capable of generating, continuous wave, amplitude modulated, frequency modulated, pulse modulated or swept frequency signal outputs. (Author)
PB-174 584 HC$3.00 MF$0.65

TRUE ROOT-MEAN-SQUARE BALLANTINE 320.
Bureau of Naval Weapons Representative, Pomona, Calif. Metrology Engineering Center.
For primary bibliographic entry see Field 9C.
PB-174 596 HC$3.00 MF$0.65

14C. RECORDING DEVICES

EVALUATION OF THE ASR VIDEO PHOTOGRAPHIC RECORDING TECHNIQUE.

National Aviation Facilities Experimental Center Atlantic City N J
For primary bibliographic entry see Field 17I.
AD-650 817 HC$3.00 MF$0.65

EVALUATION OF NEW SELF-RECORDING AIR BLAST INSTRUMENTATION: PROJECT 1.3b OPERATION SNOW BALL.
Ballistic Research Labs Aberdeen Proving Ground Md
For primary bibliographic entry see Field 19D.
AD-651 041 HC$3.00 MF$0.65

SURVEY OF DETECTORS AND DYNAMIC CALIBRATION METHODS FOR REMOTE SENSING SYSTEMS.
IIT Research Inst., Chicago, Ill.
G. Johnson, and A. J. Montgomery. Apr 67, 108p
NASA-CR-751
Contract NAS8-20107

Descriptors: *Calibration, *Detector, *Thermodynamic property, *Turbulent flow, Beam, Cross, Design, Optics, Sensor.

For abstract, see STAR 05 11.
N67-22779 HC$3.00 MF$0.65

FEASIBILITY STUDY FOR A SCANNING CELESTIAL ATTITUDE DETERMINATION SYSTEM (SCADS) FOR THREE AXIS ATTITUDE DETERMINATION AT A COMMAND AND DATA ACQUISITION (CDA) STATION FINAL REPORT.
Control Data Corp., Minneapolis, Minn. Research Div.
R. C. Borden, E. J. Farrell, C. B. Grosch, A. J. Mooers, and D. F. Nickel. 22 Sep 65, 458p
NASA-CR-83523, RD-2001
Contract NAS5-9577

Descriptors: *Data acquisition, *Digital command system, *Satellite attitude control, *Scanning device, Acquisition, Analysis, Attitude, Camera, Celestial, Command, Control, Data, Design, Detection, Device, Digital, Error, Feasibility, Identification, Instrument, Nimbus satellite, Optimization, Parameter, Satellite, Scanning, Spacecraft, Star, Station, System, Tiros satellite.

For abstract, see STAR 05 11.
N67-23052 HC$3.00 MF$0.65

AUTOMATIC TV AUDIO CUEING/DUBBING SYSTEM.
Japan Broadcasting Corp., Tokyo. Nhk Technical Research Labs.
J. Ishida, S. Iwamura, and T. Ohtani. Jan 67, 17p
Its Serial No. 106

Descriptors: *Audio equipment, *Recording instrument, *Television equipment, *Video equipment, Audio, Automatic, Effect, Equipment, Instrument, Recording, Sound, Tape, Television, Video.

For abstract, see STAR 05 11.
N67-23419 HC$3.00 MF$0.65

14D. RELIABILITY

SELF-MONITORING, SELF-CORRECTION AND SELF-REPAIR AS MEANS TO IMPROVED RELIABILITY OF COMPLEX DIGITAL SYSTEMS,
Foreign Technology Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 9B.
AD-650 804 HC$3.00 MF$0.65

THE COMPUTATION OF POWER SPECTRAL DENSITY,
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
For primary bibliographic entry see Field 12A.
AD-650 995 HC$3.00 MF$0.65

14E. REPROGRAPHY

AUTOMATIC TYPOGRAPHIC-QUALITY TYPESETTING TECHNIQUES: A STATE-OF-THE-ART REVIEW,
National Bureau of Standards, Washington, D. C. Center for Computer Sciences and Technology.
Mary Elizabeth Stevens, and John L. Little. 7 Apr 67, 105p
Hard copy available from Superintendent of Documents, GPO, Washington, D. C., 20402 $0.70.

Descriptors: (*Digital computers, Information retrieval), Automation, Machines, Printing, Documentation, Computers, Bibliographies.

The report describes the current state-of-the-art in automation of graphic arts composition, starting from either of two sources: keyboard entry of manuscript material, or mechanized input in the form of available perforated tapes or magnetic tapes. The gamut is covered from one extreme in which a skilled keyboard operator performs all of the compositor functions required to operate a typesetting machine, to the other extreme in which the input merely provides text whether or not including designation of desired font changes, followed by a high degree of automation through all operations leading to type set for printing. Intermediate automation aids for the compositor functions, including characteristics of special-purpose digital computers and functions performed by typography programs for general-purpose digital computers, are reviewed. Characteristics of automatically operated typesetting mechanisms, including hot metal casting machines and photocomposers, slow, medium and high speed, are outlined. Applications of new techniques for typographic-quality automated composition that are of interest in scientific and technical information centers, libraries, and other documentation operations include sequential card camera listings, computer-generated KWIC indexes, photocomposition of technical journals, automatic composition of books containing both computer-produced tabular data and natural language texts, and the incorporation of mechanized processes throughout the publication cycle from the author's original manuscript preparation to the final printing. (Author)
NBS-Mono-99 HC$0.70 MF$0.65

AIRBORNE AND MISSILE BORNE CAMERAS DEVELOPED BY WEAPONS RESEARCH ESTABLISHMENT.
Weapons Research Establishment, Salisbury (Australia). Dept. of Supply.
F. Spencer. Sep 66, 46p NRE-ISD-TN-78

Descriptors: *Airborne equipment, *Ballistic camera, *Photographic recording, *Rocket photography, Airborne, Angle, Australia, Ballistics, Camera, Design, Equipment, Film, Instrumentation, Lens, Measurement, Missile, Performance, Photographic, Photography, Recording, Rocket, Wide.

For abstract, see STAR 05 11.
N67-22936 HC$3.00 MF$0.65

NIGHT PHOTOGRAPHY WITH THE LATEST U.S. ELECTRONIC FLASH UNITS.
Royal Aircraft Establishment, Farnborough (England).
R. Watts. Jul 66, 22p RAE-TR-66227

Descriptors: *Aerial photography, *Electronic equipment, *Flash, *Flight test, Aerial, Altitude, Atmospheric, Camera, Electronic, Equipment, Film, Flight, Ground, Haze, Illumination, Night, Photography, Test, Twilight.

For abstract, see STAR 05 11.
N67-23086 HC$3.00 MF$0.65

15. MILITARY SCIENCES

15B. CHEMICAL, BIOLOGICAL, AND RADIOLOGICAL WARFARE

THE ENHANCEMENT OF PENETRATION OF AN ORGANOPHOSPHORUS ANTICHOLINESTERASE THROUGH GUINEA PIG SKIN BY DIMETHYL SULFOXIDE.
Defence Chemical Biological and Radiation Labs Ottawa (Ontario)
For primary bibliographic entry see Field 6T.
AD-650 797 Not available from CFSTI.

15C. DEFENSE

MAGNETIC TAPE PROGRAMS AND USAGE FOR THE OPERATIONS CONTROL CENTER PROJECT,
David Taylor Model Basin Washington D C Applied Mathematics Lab
For primary bibliographic entry see Field 9B.
AD-650 596 HC$3.00 MF$0.65

EXTENSION OF THE GENERAL SENSITIVITY ANALYSIS. VOLUME I. METHODOLOGY.
Final rept.,
Research Triangle Inst Durham N C Operations Research and Economics Div
Philip S. McMullan, and Alvin M. Cruze. 15 Mar 67, 70p Rept no. R-OU-230-2-Vol-1
Contract OCD-PS-64-56
See also AD-650 928 - VOL. II; AD-650 929 - VOL. III.

Descriptors: (*Computer programs, *Civil defense systems), Sensitivity, Analysis, Weapon systems, Radioactive fallout, Statistical analysis, Fallout shelters, Mathematical analysis, Tables.

The final report, Extension of the General Sensitivity Analysis, consists of three volumes. Volume I, Methodology, discusses the methodology derived for civil defense sensitivity analysis and the results of demonstration runs employing the methodology on a statewide basis. Volume II, Technical Appendixes, gives details on derivations of the analytical expressions in the model. Volume II also reports: (1) supplementary sensitivity analyses using the model on a limited basis and (2) sensitivity analysis of population exposure to nuclear weapons effects. Volume III, The ANCET Computer Program, reports on the detailed structure of the FORTRAN computer model used to calculate casualties for the sensitivity analyses. The objective of the research reported is to perform Civil Defense System sensitivity analyses which are designed to indicate the relative importance of the parameters used in total civil defense systems evaluation. The following questions must be answered for each parameter: Is the ranking of the effectiveness of civil defense systems altered as the parameter is varied over its range of uncertainty. When the answer to question is affirmative, can further research clarify or narrow the range of uncertainty. Can systems evaluation methodology be altered to reduce the importance of uncertainty. Should systems analyses report effectiveness for several values of the parameter. To assist in these analyses, a rapid-running computer model has been designed to estimate casualties from a nuclear attack. The model's main features and broad outlines of operation are presented. (Author)
AD-650 927 HC$3.00 MF$0.65

EXTENSION OF THE GENERAL SENSITIVITY ANALYSIS. VOLUME II. TECHNICAL APPENDIXES.
Final rept.,
Research Triangle Inst Durham N C Operations Research and Economics Div
Alvin M. Cruze, and Campbell Read. 15 Mar 67, 199p Rept no. R-OU-230-2-Vol-2
Contract OCD-PS-64-56
See also AD-650 927 - Vol I, and AD-650 929 - Vol 3.

Descriptors: (*Computer programs, *Civil defense systems), Sensitivity, Analysis, Radioactive fallout, Casualties, Statistical analysis, Nuclear explosions, Population.
Identifiers: ANCET.

Volume I, Methodology, discusses the methodology derived for civil defense sensitivity analyses and the results of demonstration runs employing the methodology on a statewide basis. Volume II, Technical Appendixes, gives details on derivations of the analytical expressions in the model and supplementary information on the analyses reported in Volume I. In order to perform calculations necessary for sensitivity analyses, and analytical computer model, called ANCET, was designed. The model computes both prompt effects and fallout casualties from a thermonuclear attack. The derivation of the analytical expressions for the prompt effects component model is reported in this volume. Analytic procedures for adapting the WSEG-10 fallout model for use as the ANCET fallout component model are also presented. Sensitivity analyses of the effect of the choice of parameters of the prompt effects casualty function show that casualty estimates are sensitive both to the choice of casualty function and to the assumed yield of the Japanese detonations. A sensitivity analysis of the exposure of population located both in circular urban areas and in circumferential rings to blast overpressure levels from nuclear detonation is also given. (Author)
AD-650 928 HC$3.00 MF$0.65

EXTENSION OF THE GENERAL SENSITIVITY ANALYSIS. VOLUME III. THE ANCET COMPUTER PROGRAM.
Final rept.,
Research Triangle Inst Durham N C Operations Research and Economics Div
Alvin M. Cruze, Dora B. Wilkerson, and Mary B. Woodside. 15 Mar 67, 210p Rept no. R-OU-230-2-Vol-3
Contract OCD-PS-64-56
See also AD-650 927-Vol. 1, AD-650 928-Vol. 2.

Descriptors: (*Computer programs, *Civil defense systems), Sensitivity, Analysis, Casualties, Radioactive fallout, Subroutines, Programming (Computers), Nuclear explosions.
Identifiers: ANCET.

Detailed structure is reported of the FORTRAN computer model utilized to perform the casualty calculations for the sensitivity analyses. The model is designed specifically to assist in performing national sensitivity analyses of total Civil Defense Systems. The model, known by the acronym ANCET, features simplified input data variation and rapid computation of the expected number of casualties from a specified attack. These are accomplished by the use of readily varied analytical experessions throughout the model. These expressions approximate areal population and shelter distributions, prompt effects casualty functions, and various relationships in the fallout model. Included are: (1) instructions for preparation of program input, (2) detailed flow diagrams and verbal descriptions of each of the program subroutines, (3) a description of program output, and (4) a FORTRAN listing of each of the model subroutines. (Author)
AD-650 929 HC$3.00 MF$0.65

PROTECTION ANALYSIS AND CONSTRUCTION EVALUATION SYSTEM.
Final rept., 13 Jan 65-15 Jan 66,
Research Triangle Inst Durham N C Operations Research and Economics Div
F. A. Bryan, Jr., E. L. Hill, B. W. Howard, T. Johnson, and R. O. Lyday. 15 Jan 66, 31p Rept no. R-OU-205
Contract OCD-PS-65-47

Descriptors: (*Fallout shelters, *Computer programs), Civil defense systems, Protection, Radioactive fallout, Structures, Computers, Analysis, Design.

The task assignments in this project were principally concerned with the implementation of a CDC-3600 computer program for computing PF's of structures (PF-COMP) as well as with additions to the program which would make it more useful to architects and engineers. The program was implemented by The Research Triangle Institute (RTI) through the Office of Civil Defense first in the performance of the Military Overseas Shelter Survey (MOSS) and subsequently in the analysis of federal buildings designated by the Office of Civil Defense. Finally, implementation of the computer program as a service to qualified fallout shelter analysts was performed in the Shelter Analysis for New Designs (SAND) program. A principal addition to the PF-COMP computer program which will render it more useful to architects and engineers consisted of an analytical routine for cost effectiveness modification of structures to improve basement shelter PF. Incorporated as a subroutine in this supplementary program is a technique which permits definition of shelter boundary as a function only of percentage roof contribution and shelter location within a structure. (Author)
AD-650 930 HC$3.00 MF$0.65

CONSUMER BEHAVIOR AND WORKER PARTICIPATION IN RECOVERY ACTIVITIES,
Human Sciences Research Inc Mclean Va 4710
William W. Chenault, and Peter G. Nordlie. Feb 67, 81p Rept no. HSR-RR-67/5-T1
Contract OCD-PS-65-29

Descriptors: (*Civil defense systems, Recovery), Nuclear warfare, Organizations, Survival, Consumption, Distribution (Economics), Behavior, Motivation, Disasters, Communication systems, Performance (Human), Vulnerability, Manpower, Population.
Identifiers: Postattack operations.

The study is concerned with the problem of securing the participation of the survivors of a nuclear attack in an organized recovery effort. It describes the potential effects on motivation and organization of the different localized perspectives in which individual survivors would view disaster and respond to demands for nationally oriented work activity. The study assumes that recovery would require the integration of recovery activities on a national basis, that forcing functions of time would be placed on the performance of critical recovery activities, that survivors would perceive a scarcity of consumer items (especially food), and that the natural proclivities and motivations of survivors would lead them to engage in activities other than those required by an integrated national effort. Given those assumptions, the report describes a set of system characteristics that would, if built into a distribution system for consumer goods, allow the system to perform two tasks: (1) meet consumer needs and (2) provide the means for guiding the postattack behavior of survivors toward the performance of critical recovery activities. (Author)
AD-651 098 HC$3.00 MF$0.65

COST AND FINANCING OF CIVIL DEFENSE: SOME PUBLIC VIEWS,
Pittsburgh Univ Pa Dept of Sociology 39
Alan N. Coleman. Feb 67, 77p
Contract DAHC20-67-C-0122, Grant NSF G11309

Descriptors: (*Civil defense systems, Economics), Costs, Fallout shelters, Public opinion.

The report attempts to bring together, from a number of national and community studies, the results regarding the American public's views on the cost and financing of civil defense measures and programs. Given the limitations imposed by the number and diversity of the studies used, the following generalizations obtained: (1) increasing civil defense expenditures in general is believed desirable; (2) many citizens are uncertain about what fallout protection should cost; (3) personal assumption of the total or even partial cost for family shelters is not favored; (4) major objections to family fallout shelters involve cost; (5) favorability of public as well as family fallout shelters is increased when federal or state financial assistance is included; (6) a substantial portion of the citizenry favors a tax reduction or exemption for shelters; (7) indirect inducements for building shelters generally meet the approval of the public; (8) specified alternative methods of financing shelters have been met with disapproval or uncertainty; (9) public shelters are viewed as effective and worth the cost; (10) among alternative programs, education and health rank ahead of civil defense measures, and very few people currently agree that civil defense monies would be better spent on missiles and bombers. The majority of the studies utilized were conducted in the early 1960's--a time when the family shelter controversy reached it apex. General cost and financing issues and alternatives have not been probed extensively in national and community surveys. (Author)
AD-651 167 HC$3.00 MF$0.65

15E. LOGISTICS

UNIVAC PROCESSING OF THE ELECTRONIC FAILURE TABULATION PROBLEM FOR THE BUREAU OF SHIPS.
Research and development rept.,
David Taylor Model Basin Washington D C Applied Mathematics Lab
Mary W. Dorey. Nov 60, 109p
DTMB-1433

Descriptors: (*Electronic equipment, Failure (Electronics)), (*Data processing systems, *Failure (Electronics)), Reports, Digital computers, Programming (Computers).

The Applied Mathematics Laboratory of the David Taylor Model Basin produces Electronic Failure Report Tabulations for The Bureau of Ships. Analyzing approximately 35,000 failure reports each month is accomplished by the use of UNIVAC, a large-scale electronic computer. Fourteen edited reports of various sequences and formats are available through computer processing. This report contains a description of the problem and details of how it is produced on the computer. (Author)
AD-650 568 HC$3.00 MF$0.65

THE ELECTRONIC INSTALLATION RECORD SYSTEM PROBLEM.
David Taylor Model Basin Washington D C Applied Mathematics Lab
For primary bibliographic entry see Field 9B.
AD-650 593 HC$3.00 MF$0.65

LOGISTICS INFORMATION SYSTEMS.
George Washington Univ Washington D C Logistics Research Project

24 Feb 67, 105p Rept no. Serial-TM-13844-CH-3 Contract N00014-67-A-0214

Descriptors: (*Logistics, *Information retrieval), (*Armed forces transportation, *Data processing systems), (* nagement engineering, Programming (Computers)), Naval equipment, Naval research, Problem solving, Networks, Computer storage devices, Data storage systems, Libraries.

A proposed activity and several contemporary undertakings are described. A phased research undertaking spanning several years of effort is proposed with the objective of securing fundamental and durable improvements within that subdomain of information science which pertains to the management and use of large volume data files. A point of view is introduced which stresses the opinion of the authors – that much of the difficulty which is connected with the employment of large volume files emanates from two sources, a lack of adequate attention to this aspect of data processing, and to questions of suitability of computer instruction sets. Several phases of effort are described, each being marked by its terminal event. These phases embody planning, research and experimentation and finally the embodiment of the principles evoked by the program in a realistic system environment. Concurrent programs of research in data processing are described in some detail. These research programs are concerned with activities of the following varieties: The use of associative memories as routine instruments of data processing; The construction of a direct access program library system; The construction of data loading and retrieval system for a family of direct access devices; The construction of a special programming system for use in connection with the study of transportation networks; The creation and exploitation of a problem solving program.
AD-650 748 HC$3.00 MF$0.65

MODIFICATIONS TO PHILO LOGISTICS MODEL. VOLUME I. PROBLEM STATEMENT,
Operations Research Inc Santa Monica Calif
Harry Grossman, James H. Hamilton, Donna E. Mandell, Michael W. Pulscak, and Arthur Reiff.
21 Dec 63, 49p
Contract NBy-32223
See also AD-650 855.

Descriptors: (*Logistics, *Amphibious operations), (*Mathematical models, Logistics), Marine Corps, Computer programs, Simulation, Operations research, Sequential analysis, Specifications.

An investigation was made to modify a logistic systems study (PHILO) to provide improved methods and techniques for efficient distribution of mean and supplies involved in expeditionary operations. Volume I (Statement of Problem) contains a discussion of the problem and the revised model specifications.
AD-650 854 HC$3.00 MF$0.65

MODIFICATIONS TO PHILO LOGISTICS MODEL. VOLUME II. COMPUTER PROGRAM DESIGN,
Operations Research Inc Santa Monica Calif
Harry Grossman, James H. Hamilton, Donna E. Mandell, Michael W. Pulscak, and Arthur Reiff.
21 Dec 63, 81p
Contract NBy-32223
See also AD-650 854.

Descriptors: (*Logistics, *Amphibious operations), (*Computer programs, Logistics), Marine Corps, Operations research.

An investigation was made to modify a logistic systems study (PHILO) to provide improved methods and techniques for efficient distribution of men and supplies involved in expeditionary operations. Volume II (Computer Program Design) contains a detailed explanation of the computer program (e.g., organization, description, flow charts, input-output formats and operating instructions). (Author)
AD-650 855 HC$3.00 MF$0.65

TECHNOLOGY AND ARMAMENT.
Department of the Army Washington D C 0900
For primary bibliographic entry see Field 15G.
AD-651 106 HC$3.00 MF$0.65

COMPARISON OF OLIVE GREEN AND CAMOUFLAGE PRINTED NOMEX NYLON COVERALL CLOTH.
Naval Air Engineering Center Philadelphia Pa Aeronautical Materials Lab
For primary bibliographic entry see Field 11E.
AD-651 214 HC$3.00 MF$0.65

FIRST ANNUAL LOGISTICS MANAGEMENT SYMPOSIUM, SEPTEMBER 13 AND 14, 1966.
National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
For primary bibliographic entry see Field 5A.
For abstract, see STAR 05 11.
N67-21962 HC$3.00 MF$0.65

MANAGEMENT OF CONTRACTOR DATA AND REPORTS. VOLUME II: AUTHORIZED DATA LIST.
Air Force Systems Command, Washington, D. C.
For primary bibliographic entry see Field 5B.
PB-172 870-H HC$3.00

15F. NUCLEAR WARFARE

EXTENSION OF THE GENERAL SENSITIVITY ANALYSIS. VOLUME I. METHODOLOGY.
Research Triangle Inst Durham N C Operations Research and Economics Div
For primary bibliographic entry see Field 15C.
AD-650 927 HC$3.00 MF$0.65

EXTENSION OF THE GENERAL SENSITIVITY ANALYSIS. VOLUME II. TECHNICAL APPENDIXES.
Research Triangle Inst Durham N C Operations Research and Economics Div
For primary bibliographic entry see Field 15C.
AD-650 928 HC$3.00 MF$0.65

EXTENSION OF THE GENERAL SENSITIVITY ANALYSIS. VOLUME III. THE ANCET COMPUTER PROGRAM.
Research Triangle Inst Durham N C Operations Research and Economics Div
For primary bibliographic entry see Field 15C.
AD-650 929 HC$3.00 MF$0.65

MANUAL OF DATA GATHERING PRACTICE RELATIVE TO THE REUSABILITY OF BUILDINGS AFTER A WARFIRE.
Lin (T Y) and Associates Van Nuys Calif 05
For primary bibliographic entry see Field 13L.
AD-651 009 HC$3.00 MF$0.65

TRIAL SURVEY AND ANALYSIS OF SEVERAL BUILDINGS RELATIVE TO THEIR REUSABILITY AFTER A WARFIRE.
Lin (T Y) and Associates Van Nuys Calif 05
For primary bibliographic entry see Field 13L.
AD-651 010 HC$3.00 MF$0.65

15G. OPERATIONS, STRATEGY, AND TACTICS

ON RELATING NON-TECHNICAL ELEMENTS TO SYSTEM STUDIES,
Rand Corp Santa Monica Calif
James R. Schlesinger. Feb 67, 35p Rept no. P-3545
Prepared for presentation at Military Operations Research Society (Annual Meeting), El Paso, Texas, 25-27 Apr 67.

Descriptors: (*Military strategy, Decision making), Operations research, Foreign policy, Political science, Economics, Systems engineering, Effectiveness.

The paper examines military capabilities in the narrower sense, speculating on the inherent limitations of analyses that neglect nonmilitary factors and considering whether the structuring or the implementation of such studies has indeed contributed to policy failures. Five major themes are developed: First, the omission of certain broader political social factors does imply an inherent limitation in military systems studies. Second, to a certain degree such self-imposed limitations are defensible in the attempt to deal (suboptimally) with a critical portion of the overall problem. Third, the chief difficulties arise in the transition from these analytical studies, admittedly suboptimized, to decisionmaking. Fourth, major systems studies, though assumed to be suboptimized, inevitably incorporate a number of non-technical assemptions, though typically in a tangential and implicit fashion. Fifth, in many decisions the use of specialized studies without buttressing by the explicit and extensive examination of the non-technical factors does lead to incomplete results and inadequate conclusions -- which may be highly embarrassing with respect to national policy. (Author)
AD-650 846 HC$3.00 MF$0.65

MODIFICATIONS TO PHILO LOGISTICS MODEL. VOLUME I. PROBLEM STATEMENT,
Operations Research Inc Santa Monica Calif
For primary bibliographic entry see Field 15E.
AD-650 854 HC$3.00 MF$0.65

MODIFICATIONS TO PHILO LOGISTICS MODEL. VOLUME II. COMPUTER PROGRAM DESIGN,
Operations Research Inc Santa Monica Calif
For primary bibliographic entry see Field 15E.
AD-650 855 HC$3.00 MF$0.65

THE DEVELOPMENT OF THE SOVIET ARMED FORCES, 1917-1966.
Documentary research study,
Air Univ Maxwell AFB Ala Aerospace Studies Inst
Kenneth R. Whiting. 1966, 101p Rept no. AU-201-66-ASI

Descriptors: (*USSR, *Armed forces operations), (*Military organizations, USSR), Mobilization, Military intelligence, Military tactics, Armed forces (Foreign), Weapons, History.

This document describes the development of the Soviet Armed Forces during the period 1917 through 1966. It includes the organization, the size, the quality, and the weapons as they evolved during this time.
AD-650 973 HC$3.00 MF$0.65

TECHNOLOGY AND ARMAMENT.
Department of the Army Washington D C 0900
16 Mar 67, 133p Rept no. J-1667
TT-67-61700
Trans. of Tekhnika i Vooruzhenie (USSR), n12 96p 1966.

Descriptors: (*Armament, Combat readiness), (*Combat readiness, Military training), USSR, Economics, Warfare, Maintenance, Armed forces (Foreign), Computers, Infrared detectors, Quality control, Military training, Monitors, Corrosion inhibition, Systems engineering.

Contents: Strengthen the bonds between science and labor; Beginning the jubilee year; Taming the 'Typhoon'; Immortality; Exercise 'Vltava'; Selection of infrared signals; Checking the quality of fuels and lubricants; Clearly means intelligibly; Becoming a driver; The technical knowledge of an officer; Training in economics for engineers; Examinations for ratings; Pickup unit to record crossing of cease fire line by tank; Protection against corrosion; Using a mine detector in winter; Model of an optimalizing system; Organizational equipment -- Present and future; Black sea fleet innovators experience and initiative; Devoted to an important problem; Publishing houses and equipment in 1967.
AD-651 106 HC$3.00 MF$0.65

16. MISSILE TECHNOLOGY

16A. MISSILE LAUNCHING AND GROUND SUPPORT

CENTURY CODED TIMING FORMAT.
Royal Aircraft Establishment, Farnborough (England).
E. S. Mallett. Nov 65, 15p RAE-TR-65249, AD-478913

Descriptors: *Code, *Instrumentation, *Missile range, *Time signal, Circuit, Digital, Format, Index, Missile, Modulation, Pulse, Range, Second, Signal, Timing.

For abstract, see STAR 05 11.
N67-22781 HC$3.00 MF$0.65

BLACK BRANT ROCKET AA-III-11 LAUNCHED AT CHURCHILL RESEARCH RANGE 21 APRIL 1965.
National Research Council of Canada, Ottawa (Ontario). Space Research Facilities Branch.
Oct 66, 38p SRFB-001

Descriptors: *Black brant iii missile, *Launching, *Payload, Angle, Cosmic, Density, Distribution, Electron, Energy, Engineering, Experiment, Performance, Pitch, Plasma, Probe, Ray, Spectrum, Temperature.

For abstract, see STAR 05 11.
N67-22944 HC$3.00 MF$0.65

16B. MISSILE TRAJECTORIES

A PRELIMINARY STUDY OF THE MECHANISM OF WATER-ENTRY WHIP OF 20-DEGREE CONE NOSED MODELS,
Naval Ordnance Lab White Oak Md
John O. Gurney, Jr. 1 Aug 66, 28p Rept no. NOLTR-66-148, Ballistics Research-168

Descriptors: (*Guided missile models, *Water entry), Nose cones, Center of gravity, Moment of inertia, Pitch (Motion), Landing impact.

Preliminary experimental data are reported on the whip behavior of 20-degree cone nosed models with variable center of gravity and variable transverse moment of inertia launched at 45 degrees and at 105-135 feet per second. The results are compared with fundamental ideas and it is concluded that there is a high sensitivity of whip to initial pitch and that there may be a force distribution on the nose producing the effect of a couple during nose penetration. (Author)
AD-650 925 HC$3.00 MF$0.65

FLUTTER SIMULATION,
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
J. P. Kearns. 24 Apr 62, 46p Rept no. CF-2984 Contract NOrd-7386

Descriptors: (*Flutter, Simulation), (*Guided missiles, Flutter), Simulators, Supersonic characteristics, Supersonic flight, Stability, Wings, Mathematical analysis.

Flutter simulation is a closed loop ground vibration to find flutter speeds on actual missile wings. The elements in a closed loop convert the wing linear and angular motions into electro-mechanical forces which simulate the aerodynamic forces generated by the motions in supersonic flight at some chosen Mach number and altitude. If the closed loop becomes unstable, it is inferred that the missile surface would become unstable in flight. (Author)
AD-650 981 HC$3.00 MF$0.65

THE AMICOM PLASMA DRIVEN SHROUD WIND TUNNEL (DESIGN AND CONSTRUCTION REPORT),
Army Missile Command Redstone Arsenal Ala Physical Sciences Lab
For primary bibliographic entry see Field 14B.
AD-651 187 HC$3.00 MF$0.65

SPREAD OF DECOYS FROM A BALLISTIC MISSILE.
Royal Aircraft Establishment, Farnborough (England).
G. B. Longden. Dec 64, 31p RAE-TR-64074

Descriptors: *Ballistic missile decoy, *Missile trajectory, *Reentry decoy, Ballistics, Decoy, Ejection, Ellipsoid, Missile, Reentry, Trajectory, Velocity.

For abstract, see STAR 05 11.
N67-22708 HC$3.00 MF$0.65

GRAVITATIONAL PERTURBATIONS OF BALLISTIC MISSILE TRAJECTORIES. V. TIME OF FLIGHT OVER A SPHEROIDAL EARTH.
Royal Aircraft Establishment, Farnborough (England).
R. B. Law, and M. F. Woollett. Aug 63, 90p RAE-TN-WE-36

Descriptors: *Ballistic missile, *Earth shape, *Flight time, *Missile trajectory, *Oblateness, Ballistics, Earth, Effect, Flight, Gravitational, Missile, Perturbation, Shape, Spheroid, Time, Trajectory.

For abstract, see STAR 05 11.
N67-22719 HC$3.00 MF$0.65

16D. MISSILES

ELASTIC-PLASTIC RESPONSE OF STRUCTURES TO BLAST AND IMPULSE LOADS.
J G Engineering Research Associates Baltimore Md
For primary bibliographic entry see Field 13M.
AD-651 051 HC$3.00 MF$0.65

AIRBORNE AND MISSILE BORNE CAMERAS DEVELOPED BY WEAPONS RESEARCH ESTABLISHMENT.
Weapons Research Establishment, Salisbury (Australia). Dept. of Supply.
For primary bibliographic entry see Field 14E.
For abstract, see STAR 05 11.
N67-22936 HC$3.00 MF$0.65

WATER-LANDING CHARACTERISTICS OF A 1/10-SCALE MODEL OF A WINGED MISSILE.
National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
L. J. Fisher, and J. O. Windham. Apr 67, 27p NASA-TN-D-3799
Contract 124-08-04-15-23

Descriptors: *Missile, *Scale model, *Water landing, *Winged vehicle, Dynamic, Fuselage, Gear, Hydroski, Landing, Model, Moment, Pitch, Scale, Vehicle, Water, Wing.

For abstract, see STAR 05 11.
N67-23282 HC$3.00 MF$0.65

17. NAVIGATION, COMMUNICATIONS, DETECTION, AND COUNTERMEASURES

17A. ACOUSTIC DETECTION

PRELIMINARY DESIGN OF AN ACOUSTIC RANGING INDICATOR,
David Taylor Model Basin Washington D C 0900
F. B. Miller. Nov 61, 21p Rept no. DTMB-1494

Descriptors: (*Sound ranging, Instrumentation), Submarines, Design, Underwater telephones, Transponders, Range finding.

The report describes a preliminary instrumentation design for obtaining range information between vessels or between a vessel and a shore station. Development models were built and tested, but the project was terminated before a final design evolved. This instrumentation is used in conjunction with the UQC underwater telephone apparatus normally installed aboard submarines. Operation is in the transponder mode rather than as an echo ranging system. The range of measurement is from 0 to 2000 or more yd, depending on the sensitivity of the companion UQC and the strength of the received signal. Full-scale indication on the digital readout is 10,000 yd. The instrumentation is fully transistorized and requires a minimum of connections to the UQC. (Author)
AD-650 633 HC$3.00 MF$0.65

THE PRESSURE DISTRIBUTION ON FOUR SONAR DOME BOTTOMS.
Research and Development repts.,
David Taylor Model Basin Washington D C Hydromechanics Lab
R. D. Cahn. Mar 62, 31p DTMB-1491

Descriptors: (*Sonar domes, Pressure), Distribution, Wind tunnel models, Geometric forms, Cavitation, Model tests, Design, Shipborne.

The effect of changes in the shape of sonar dome bottoms on the pressure distribution over them was investigated. Wind-tunnel tests were made on models with bodies of EPH shape. The transverse sections of the bottoms were: Dome A-Circular; Dome B-Elliptical, 3 1/3 to 1; Dome C-Elliptical, 1 2/3 to 1; Dome D-Flat with rounded corners. Dome C appeared to have the maximum permissible flattening to maintain equal cavitation speeds on the body and the bottom. (Author)
AD-650 634 HC$3.00 MF$0.65

TECHNIQUES FOR SIMULATING THE HYDRODYNAMIC FORCES ON SONAR DOMES BY STATIC LOADS.
Research and development rept.,
David Taylor Model Basin Washington D C Structural Mechanics Lab
James A. Nott. Apr 61, 28p DTMB-1441

Descriptors: (*Sonar domes, Test methods), Simulation, Force (Mechanics), Loading (Mechanics),

Stresses, Fluid dynamic properties, Hydrostatic pressure.

Techniques were developed by which the nonuniform hydrodynamic pressures on a sonar dome in a seaway can be simulated by multiple static loads. The surface of the dome is divided into separate loading areas, and the delineated areas are loaded with hydraulic rams to simulate both negative and positive hydrodynamic pressures. Stresses can be determined by the influence-coefficient method in which the blocks are loaded individually or by loading all the blocks simultaneously to simulate the hydrodynamic load distribution. Strain and deflection measurements made on a CW-351 sonar dome indicate the feasibility of static test techniques for curved structures. The results of the tests show that influence coefficients can be used to obtain stresses in the dome for nonuniform loading. In general, stresses equivalent to those resulting from steady-state hydrodynamic loads are obtained with good accuracy by the influence-coefficient method. (Author)
AD-650 635 HC$3.00 MF$0.65

FINAL TECHNICAL REPORT.
Rept. for 1 Jan 57-31 Aug 66,
Rensselaer Polytechnic Inst Troy N Y Dept of Mathematics
Melvin J. Jacobson. 12 Apr 67, 10p Rept no. RPI-Math-74
Contract Nonr-591 (09)

Descriptors: (*Underwater sound signals, Processing), (*Underwater sound, Propagation), (*Noise, Oceans), Sound transmission, Demodulators, Statistical analysis.

Theoretical studies were conducted in three general areas: signal processing, ocean noise, and sound propagation. The results are described briefly.
AD-650 966 HC$3.00 MF$0.65

17B. COMMUNICATIONS

ACOUSTICAL DESCRIPTION OF SYLLABIC NUCLEI: AN INTERPRETATION IN TERMS OF A DYNAMIC MODEL OF ARTICULATION,
Massachusetts Inst of Tech Cambridge Research Lab of Electronics
Kenneth N. Stevens, Arthur S. House, and Allan P. Paul. Jul 66, 14p Rept no. Scientific-1
AFCRL-66-856
Contract AF 19 (628)-5661
Prepared in cooperation with Purdue Univ., Lafayette, Ind. Dept. of Audiology and Speech Science and Bolt Beranek and Newman, Inc., Los Angeles, Calif.
Availability: Published in Journal of the Acoustical Society of America v40 n1 p123-32 Jul 1966.

Descriptors: (*Speech, Analysis), Sound, Audiofrequency, Phonetics, Measurement, Digital computers, English language.

Measurements of formant frequencies throughout the vocalic portions of a number of phonemically symmetric consonant-vowel-consonant utterances have been performed using spectrum-matching techniques implemented on a digital computer. The contours representing the first two formants as a function of time are described in terms of several parameters, including initial and final frequencies, midpoint frequencies, durations, and measures of curvature. The data illustrate the manner in which each of these parameters is influenced by the features of the vowel and by place of articulation of the adjacent consonants. The results provide evidence that diffuse tense vowels in English are characterized by diphthongal asymmetric articulatory motions, whereas nondiffuse vowels are not, and that the influence of the consonantal environment on the articulation of the vowel is greater for lax vowels than for tense vowels. Some general statements are made concerning the extent to which contiguous vowels and consonants influence each other's production. (Author)
AD-650 676 Not available from CFSTI.

RADIO LINKS AND ANTENNAS IN BOUNDLESS OR BOUNDED LOSSY MEDIA.
Istituto Universitario Navale Naples (Italy)
For primary bibliographic entry see Field 17B.
AD-650 719 HC$3.00 MF$0.65

RADIO LINKS AND ANTENNAS IN BOUNDLESS OR BOUNDED LOSSY MEDIA.
Final scientific rept.,
Istituto Universitario Navale Naples (Italy)
Eugenio Corti, Giorgio Franceshetti, and Gaetano Latmiral. 30 Jan 67, 119p
AFCRL-67-0187
Contract AF 61 (052)-851

Descriptors: (*Data transmission systems, Radio transmission), (*Antennas, Propagation), Electrical impedance, Efficiency, Underground antennas, Underwater, Electromagnetic fields, Mathematical analysis.

The report is divided into three parts. The first part deals with the definition of suitable simple, clear and distance invariant parameters, apt to describe the radiation and reception of electromagnetic fields into boundless or bounded lossy media, as well as with the computation of the radio link formula in various situations (e. g., the far, intermediate and near field range in sub-surface or underwater propagation). The second part deals with the computation of the above parameters for linear electric bare antennas with a sinusoidal current distribution of complex argument. The above parameters are referred under several graphs. The most interesting result is that the efficiency of a bare antenna may reach relatively high values (e.g. from 20% up to 40%), provided that the length of the antenna is of the order of the wavelength into the lossy medium. The third part deals with a new type of antenna, particularly suitable for applications in lossy media, and realized by means of two closely spaced parallel plates, whose gap is filled by an insulator. The plates act as current collectors. Some preliminary experiment on model and real parallel plate antennas are referred. (Author)
AD-650 719 HC$3.00 MF$0.65

A FREQUENCY-DIFFERENTIAL PHASE-SHIFT KEYED DIGITAL DATA MODEM FOR OPERATION AT 4800, 2400, 1200, AND 600 BITS PER SECOND OVER LONG-RANGE HF PATHS.
General Dynamics/Electronics Rochester N Y
For primary bibliographic entry see Field 17B.
AD-650 726 HC$3.00 MF$0.65

A FREQUENCY-DIFFERENTIAL PHASE-SHIFT KEYED DIGITAL DATA MODEM FOR OPERATION AT 4800, 2400, 1200, AND 600 BITS PER SECOND OVER LONG-RANGE HF PATHS.
Final rept.,
General Dynamics/Electronics Rochester N Y
Gene C. Porter, Martin B. Gray, and Charles E. Perkett. Oct 66, 72p
ESD-TR-66-639
Contract AF 19 (628)-5536

Descriptors: (*Data transmission systems, Digital systems), Radio transmission, High frequency, Phase shift, Multipath transmission, Performance (Engineering).

The ANDEFT/SC-320 is a variable rate (4800, 2400, 1200 or 600 bits/second) digital data modem prototype specifically designed for reliable communication over long-range high-frequency radio circuits. This modem employs such advanced and proven techniques as frequency-differential phase-shift keying, correlation detection, extended symbol length, guard time, segmented AGC, and dual-mode precision synchronization to combat HF anomalies such as multipath delay spread, frequency selective fading, high intensity atmospheric noise and man-made interference. The modem has provision for dual signal source diversity operation to capitalize on available space, frequency, or polarization diversity facilities, and in addition, can be operated with in-band frequency diversity. The prototype is built in two separate cabinets (modulator and demodulator) to enable field testing and to allow for easy expansion to an ultimate data capacity of 9600 bits/second. This report presents the principles of operation of the modem and the results of tests to determine the back-to-back performance in additive white Gaussian noise. (Author)
AD-650 726 HC$3.00 MF$0.65

AN ELECTRONIC INSTRUMENT FOR MEASURING VELOCITY, DISTANCE TRAVERSED AND TIME,
Foreign Technology Div Wright-Patterson AFB Ohio
D. N. Chekalov, L. G. Mulyar, V. I. Krasikov, A. K. Miroshnichenko, and N. E. Smirnov. 23 Jan 67, 17p Rept no. FTD-HT-66-694
Unedited rough draft trans. of Patent (USSR) 170 776, appl. 822710/26-24, 4 Mar 63.

Descriptors: (*Radio equipment, *Range finding), Electronic recording systems, Phase (Electronics), Modules (Electronics), Geodesics, Instrumentation, Radio signals, Velocity, Time, USSR.

The report contains a device which measures velocity, distance traversed, and time, combines a high-precision tellurometer, a phase recorder equipped with a unit for converting sinusoidal signals to pulsed signals, and a unit for measuring phase differences. Readings are made visually. The circuit connections of the device, consisting of a series of computer-type modules. English translation. (Author)
AD-650 799 HC$3.00 MF$0.65

LF AND VLF REFLECTION LOSS IN THE LOWER IONOSPHERE: A THEOREM ON ABSORPTION AND ITS APPLICATION,
Rand Corp Santa Monica Calif
For primary bibliographic entry see Field 20N.
AD-650 818 HC$3.00 MF$0.65

ECONOMICAL METHODS FOR CALCULATING LF AND VLF IONOSPHERIC ATTENUATION BASED ON WAVE THEORY,
Rand Corp Santa Monica Calif
For primary bibliographic entry see Field 20N.
AD-650 819 HC$3.00 MF$0.65

ELECTROMAGNETIC INTERFERENCE MEASUREMENT METHODS - SHIELDED ENCLOSURE.
Georgia Inst of Tech Atlanta Engineering Experiment Station
For primary bibliographic entry see Field 20N.
AD-650 830 HC$3.00 MF$0.65

DATA TRANSFER EXPERIMENTATION FOR CONUS.
National Aviation Facilities Experimental Center Atlantic City N J
For primary bibliographic entry see Field 1E.
AD-650 902 HC$3.00 MF$0.65

AN EXAMPLE OF THE ANALYSIS OF SATELLITE BUNCHING CHARACTERISTICS,
Rand Corp Santa Monica Calif
For primary bibliographic entry see Field 22C.
AD-650 905 HC$3.00 MF$0.65

INTERFERENCE REDUCTION EQUIPMENT, TRANSMITTER FIXES.

Final rept.,
National Aviation Facilities Experimental Center Atlantic City N J
William F. Herget, and Dominick L. Offi. Oct 66, 47p
FAA-RD-66-59

Descriptors: (*Radio interference, Reduction), (*Radar interference, Reduction), Radar equipment, Noise (Radar), Filters (Electromagnetic wave), Radar transmitters, Radiofrequency filters, Voltage, S band, L band.

Two sets of radar RF filters (S-band and L-band), to reduce radar interference, were tested. Each filter was inserted in the transmission lines. It was found that interfering radiations could be effectively reduced by RF filtering. It was recommended that these filters be installed on FAA radars at field sites where radar interference exists.
AD-650 915 HC$3.00 MF$0.65

DESIGN OF RADIO ENGINEERING INSTRUMENTS,
Foreign Technology Div Wright-Patterson AFB Ohio
V. F. Barkan, and V. K. Zhdanov. 25 Jan 67, 652p Rept no. FTD-HT-66-265
TT-67-61672
Unedited rough draft trans. of mono. Proektirovanie Padiotekhnicheskikh Ustroistv, Moscow, 1963 515p.

Descriptors: (*Radio equipment, Design), USSR, Handbooks, Amplifiers, Intermediate frequency amplifiers, Radiofrequency amplifiers, Video amplifiers, Automatic gain control, Radio transmitters, Radio receivers, Oscillators, Limiters, Frequency converters, Demodulators.

The book is a student handbook in course and graduate design for technicians specializing in radio engineering. The handbook proposes a general method of design for low frequency amplifiers, video amplifiers, radio receiving and transmitting equipment. It shows the calculation of low and high frequency radio circuits, and gives examples of the calculation involving vacuum tubes and transistors. This book represents an attempt to systematize the methods of rough and technical design and computation of radio receiving and transmitting devices, low-frequency and video amplifiers, as well as typical stages using semiconductors, within an approved curriculum. The first four chapters explore the general problems in undergraduate and graduate design, and in approximate calculations. In the remaining chapters, the method of technical design is demonstrated and examples are given. The book provides basic mathematical relations and formulas, as well as a methodology and examples of problem solutions. Comparative characteristics of the physical peculiarities in uniform cascaded stages are included. Required handbook data for computations is given in the text and in appendices at the back of the book. (Author)
AD-651 074 HC$3.00 MF$0.65

SEMIANNUAL PROGRESS REPORT COVERING PERIOD JULY 1, 1966-DECEMBER 31, 1966.
Harvard Univ Cambridge Mass Div of Engineering and Applied Physics
For primary bibliographic entry see Field 20L.
AD-651 121 HC$3.00 MF$0.65

PROPAGATION AND REFLECTION OF MICROWAVES.
Quarterly rept. for the period ending 31 Dec 66,
Naval Ordnance Lab Corona Calif
D. L. Thompson. 15 Mar 67, 13p Rept no.
NOLC-IED-G5

Descriptors: (*Radio transmission, *Microwaves), (*Radio communication systems, Microwaves), Radio signals, Terrain, Reflection, Frequency stabilizers, Antenna feeds, Frequency modulation, Radio equipment, V band.

Work continues on analysis of anomalies noted in the behavior of microwave signals reflected bistatically from a complex mountain terrain target. Improvements are being made on the single-side-band 'boomerang' (a portable device for optimizing the focus adjustment of the equipment used in the project) in order to permit short-range simulation of multifacet targets. Antenna feed systems and ancillary RF equipment for the 2.4 GHz region are being developed. (Author)
AD-651 202 HC$3.00 MF$0.65

COLORS OF SIGNAL LIGHTS: THEIR SELECTION, DEFINITION, MEASUREMENT, PRODUCTION, AND USE.
National Bureau of Standards, Washington, D. C. Inst. for Basic Standards.
For primary bibliographic entry see Field 13B.
NBS-Mono-75 HC$0.40 MF$0.65

RESEARCH LABORATORY OF ELECTRONICS QUARTERLY PROGRESS REPORT NO. 84.
Massachusetts Inst. of Tech., Cambridge. Research Lab. of Electronics.
For primary bibliographic entry see Field 20I.
For abstract, see STAR 05 11.
N67-22641 HC$3.00 MF$0.65

COMMUNICATIONS SYSTEM FOR ZERO-G SIMULATION IN WATER.
National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
H. E. Smith. 6 Dec 66, 17p NASA-TM-X-53547

Descriptors: *Communication system, *Underwater sound, *Weightlessness, Buoyancy, Communication, Connection, Diagram, Experiment, Gravity, Instruction, Operation, Personnel, Simulation, Sound, Station, System, Underwater, Wiring, Zero.

For abstract, see STAR 05 11.
N67-22844 HC$3.00 MF$0.65

IONOSPHERIC PREDICTIONS FOR MAY 1967.
National Physical Lab., New Delhi (India). Radio Propagation Unit.
For primary bibliographic entry see Field 20N.
For abstract, see STAR 05 11.
N67-22899 HC$3.00 MF$0.65

ANNUAL REPORT 1965-1966.
Council for Scientific and Industrial Research, Pretoria (South Africa). National Inst. for Telecommunications Research.
For primary bibliographic entry see Field 3B.
For abstract, see STAR 05 11.
N67-22950 HC$3.00 MF$0.65

IONOSPHERIC PREDICTIONS FOR MARCH 1967.
National Physical Lab., New Delhi (India).
Oct 66, 5p RRC-B126

Descriptors: *F- 2 layer, *Graph, *Radio frequency, Data, Frequency, India, Ionosphere, Prediction, Radio.

For abstract, see STAR 05 11.
N67-22967 HC$3.00 MF$0.65

IONOSPHERIC PREDICTIONS FOR FEBRUARY 1967.
National Physical Lab., New Delhi (India).
Oct 66, 5p RRC-B125
for Abstract See N67-22967

Descriptors: *F- 2 layer, *Graph, *Radio frequency, Data, Frequency, India, Ionosphere, Prediction, Radio.

For abstract, see STAR 05 11.
N67-22968 HC$3.00 MF$0.65

SURVEYOR SPACECRAFT TELECOMMUNICATIONS.
Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
C. Kirsten. 15 Mar 67, 21p NASA-CR-83553, JPL-TR-32-1105
Contract NAS7-100

Descriptors: *Command system, *Surveyor project, *Telecommunication, Antenna, Command, Ionization, Performance, Processing, Receiver, Signal, Spacecraft, Subsystem, System, Transmitter.

For abstract, see STAR 05 11.
N67-23339 HC$3.00 MF$0.65

BULLETIN NO. 3.
Swiss Association for Space Technology, Zurich (Switzerland).
For primary bibliographic entry see Field 22A.
For abstract, see STAR 05 11.
N67-23400 HC$3.00 MF$0.65

A COMPARISON OF THE PERFORMANCE OF TELEVISION TRANSMISSION SYSTEMS USING AMPLITUDE MODULATION AND FREQUENCY MODULATION.
Royal Aircraft Establishment, Farnborough (England).
H. Drysdale. Feb 66, 52p RAE-TM-WE-1201/E

Descriptors: *Amplitude modulation, *Frequency modulation, *Signal transmission, *Television transmission, Amplitude, Communication, Frequency, Link, Modulation, Signal, Television, Transmission.

For abstract, see STAR 05 11.
N67-23472 HC$3.00 MF$0.65

QUARTERLY RADIO NOISE DATA SEPTEMBER, OCTOBER, NOVEMBER 1965.
Institutes for Environmental Research, Boulder, Colo.
For primary bibliographic entry see Field 20N.
PB-174 530 HC$3.00 MF$0.65

17E. INFRARED AND ULTRAVIOLET DETECTION

EXTREME ULTRAVIOLET RADIATION DETECTORS.
Final rept., 16 Oct 64-26 Mar 66,
Electro-Mechanical Research Inc Princeton N J Photoelectric Div
S. P. Wang. 6 Jul 66, 131p
AFCRL-66-528
Contract AF 19 (628)-4763, ARPA Order-213

Descriptors: (*Ultraviolet detectors, Electromagnetic waves), Photoelectric effect, Spectrum analyzers, Photons, Photomultipliers, Electron multipliers, Ultraviolet radiation.

A workable design of a photoemission spectrometer has been developed following a thorough literature survey, a detailed design study, and a careful electron-optical investigation. The design, construction and experimental work are described along with a review of the results; and several recommendations for continued research investigation are provided. Study and test results on an EUV MPT is summarized. The development and

testing of a Windowless Extreme Ultraviolet (EUV) Photon Scintillator demonstrated that the design and operation are both satisfactory and that direct evidences can easily be obtained for two-electron photoemission processes if the quantum yield of the process is sufficiently high. (Author)
AD-650 882 HC$3.00 MF$0.65

TECHNOLOGY AND ARMAMENT.
Department of the Army Washington D C 0900
For primary bibliographic entry see Field 15G.
AD-651 106 HC$3.00 MF$0.65

REMOTE SENSING BY INFRARED AND MICROWAVE RADIOMETRY. I. BASIC PRINCIPLES. II. A TECHNIQUE FOR THE CORRECTION OF AIRBORNE MEASUREMENTS OF APPARENT SURFACE TEMPERATURE OF NATURAL WATER BODIES. III. POTENTIAL APPLICATIONS OF INFRARED AND MICROWAVE RADIOMETRY.
Wisconsin Univ Madison Dept of Meteorology
For primary bibliographic entry see Field 14B.
AD-651 188 HC$3.00 MF$0.65

17G. NAVIGATION AND GUIDANCE

OPERATIONAL EVALUATION OF DME CO-LOCATED WITH ILS FACILITIES.
Final rept.,
National Aviation Facilities Experimental Center Atlantic City N J
J. Levy, J. J. Cervi, and W. H. Hallenbeck. Apr 67, 64p
FAA-RD-66-98

Descriptors: (*Distance-measuring equipment, *Instrument landings), (*Air traffic control systems, Distance-measuring equipment), Pilots, Effectiveness, Terminal guidance.
Identifiers: Evaluation.

The operational utility and potential of DME co-located at Instrument Landing System (ILS) glide slope sites was evaluated at seven airports. Procedures based on DME at ILS were established and published. Questionnaires were developed and distributed to the pilot user groups and air traffic control personnel at the selected airports in order to obtain data based on user experience. The primary advantage of DME at ILS is to the pilot user group and provides benefits to all categories of pilots. Advantage to the Air Traffic Control system is realized through more efficient utilization of air space by pilots and the availability of positive aircraft position for use in the control function. There was general consensus that DME could contribute to improved safety at any of the types of locations involved in the evaluation. It is concluded from the evaluation that the use of DME at ILS provides (1) positive distance information in the approach phase which supplies continuity for departure and enroute flight; (2) improved ILS approach procedures; (3) simplified cockpit procedures; and (4) a reduced pilot workload. It is recommended that the use of DME at ILS be expanded to other selected airports, particularly wherein siting of navigational aids is difficult or prohibitive due to mountainous terrain, expanses of water or other environmental factors. (Author)
AD-650 565 HC$3.00 MF$0.65

EVALUATION OF LORAC RADIOLOCATION SYSTEM FOR CONDUCTING SPEED AND MANEUVERING TRIALS OF NAVAL VESSELS.
David Taylor Model Basin Washington D C Hydromechanics Lab
For primary bibliographic entry see Field 13J.
AD-650 588 HC$3.00 MF$0.65

COMPONENTS AND ELEMENTS OF GYROSCOPIC INSTRUMENTS.
Foreign Technology Div Wright-Patterson AFB Ohio
N. F. Babaeva, V. M. Erofeev, I. M. Sivokonenko, Yu. M. Khovanskii, and K. N. Yavlenskii. 5 Dec 66, 575p Rept no. FTD-HT-66-359
TT-67-61578
United rough draft trans. of mono. Detali i Elementy Giroskopicheskikh Priborov, Leningrad, 1962 498p.

Descriptors: (*Gyroscopes, Instrumentation), USSR, Suspension devices, Design, Servomechanisms.

Problems in the design and planning of standard components and elements for gyromotors, suspensions, gimbals, power transmission devices, erecting and caging devices, gyroscopic servosystems, and pickoffs are considered. The book is intended for engineers in the instrumentation industry and as a study aid for students in Soviet instrument-design institutes. (Author)
AD-650 616 HC$3.00 MF$0.65

A DUSTLESS FACTORY, A SPECIAL ENVIRONMENTAL REQUIREMENT IN THE MANUFACTURE OF PRECISION GYROSCOPES.
Foreign Technology Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 13H.
AD-650 745 HC$3.00 MF$0.65

EVALUATION OF LORAN A AND C SIMULATOR.
Final rept.,
National Aviation Facilities Experimental Center Atlantic City N J
George H. Quinn. Aug 65, 43p
FAA-RD-65-101

Descriptors: (*Simulators, Loran), Signal generators, Performance (Engineering), Loran equipment, Test methods, Test equipment.

The report contains the results of an evaluation of a Loran A and C Simulator designed to provide signals for dynamic testing of Loran receivers and ancillary equipment. Equipment difficulties discovered during the evaluation are described, and modifications that would improve the Simulator usefulness are suggested. The Simulator output was the equivalent of signals from both Loran-A and Loran-C stations. This output involved selected simulation of the existing East Coast Loran-C triad or two Loran-A station pairs and movement of an aircraft through these Loran signal coverage areas. The simulated signal included variable aircraft speed, fixed altitudes, radio frequency noise, signal strength variations, CW interference signals, and sky waves. Use of the Simulator for dynamic laboratory testing of Loran A and C Receivers is recommended including equipment modifications and revisions to the instruction manual. (Author)
AD-650 811 HC$3.00 MF$0.65

ARSR WEATHER SURVEILLANCE RADAR KIT.
Raytheon Co Wayland Mass
For primary bibliographic entry see Field 17I.
AD-650 815 HC$3.00 MF$0.65

ATCBI TRANSMITTER SITE IMPROVEMENTS MODEL ATCBI-3.
Final rept.,
Whittaker Corp North Hollywood Calif Electronics Div
F. V. Hale, Jr. Dec 65, 58p
FAA-RD-65-118
Contract FA-WA-4707
See also AD-650 824.

Descriptors: (*Air traffic control systems, *Radar equipment), Radar beacons, Airport radar systems, Modification kits, Radar transmitters.

A modification program was initiated for the ATCBI Transmitter Site equipment in accordance with Federal Aviation Agency Specification FAA-R-1404a. This specification required certain operating characteristics be altered and other operational capabilities be added to the ATCBI-3 Transmitter Site Equipment Group. Maximum transmitter output power was increased, side-lobe suppression pulse generation and monitoring circuits were added, three-mode interface operation was added, output rf switching between a directional and omnidirectional antenna was added, ancillary trigger outputs were added, and certain local control functions were deleted. This equipment was successfully modified to meet the full requirements of specification FAA-R-1404a, and the end result of this program was a modification kit suitable for field installation in the basic equipment. (Author)
AD-650 823 HC$3.00 MF$0.65

ATCBI INDICATOR SITE IMPROVEMENTS MODELS ATCBI-2 AND ATCBI-3.
Final rept.,
Whittaker Corp North Hollywood Calif Electronics Div
Frank V. Hale, Jr. Dec 65, 99p
FAA-RD-65-132
Contract FA-WA-4706
See also AD-650 823.

Descriptors: (*Air traffic control systems, *Radar equipment), Radar beacons, Airport radar systems, Modification kits, Radar transmitters.

A modification program was initiated for the ATCBI Indicator Site equipment in accordance with Federal Aviation Agency Specification FAA-E-2002a. This specification required certain operating characteristics be altered and other operational capabilities be added to both the ATCBI-2 Indicator Site Equipment Group and the ATCBI-3 Indicator Site Equipment Group. This equipment was successfully modified to meet the full requirements of specification FAA-E-2002a, and the end result of this program was modification kits suitable for field installation in the basic equipment. A separate modification kit was produced for installation in the ATCBI-2 Indicator Site Equipment Group and in the ATCBI-3 Indicator Site Equipment Group. (Author)
AD-650 824 HC$3.00 MF$0.65

MAXIMUM ACCURACY COMPATIBLE DME.
Final rept.,
National Aviation Facilities Experimental Center Atlantic City N J
D. Michael Brandewie. Sep 65, 39p
FAA-RD-65-116

Descriptors: (*Distance-measuring equipment, Accuracy), (*Instrument landings, Distance-measuring equipment), Approach indicators, Flight testing, Runways, Aircraft antennas, Guidance, Compatibility, Radio navigation.
Identifiers: VORTAC.

A high accuracy compatible DME system was tested to determine the video and indicator distance readout accuracy on the approach path to NAFEC Runway 13-31, Atlantic City Airport, New Jersey. The ground station was a Hazeltine (Model DTB), (formerly used in the now decommissioned pulse-multiplex NSME system), modified to operate at high accuracy in the normal DME frequency band. The airborne DME receiver was a high accuracy modified AVQ-70. The flight test results show the video system error and the indicator system error to be well within the plus or minus 250-foot tolerance specified by FAA Contract ARDS 585. Various design problems were investigated, the worst of which resulted in a mean shift at close ranges due to system over-

load. Limited tests indicated that the high accuracy DME system is compatible with the VORTAC system. (Author)
AD-650 831 HC$3.00 MF$0.65

AREA CONVERAGE DISPLAYS AND COURSE LINE COMPUTERS EXPERIMENTATION.
Final rept.,
National Aviation Facilities Experimental Center Atlantic City N J
G. Adams, D. Brandewie, and R. Harter. Oct 65, 92p
FAA-RD-65-117

Descriptors: (*Air traffic control systems, Display systems), (*Radio navigation, Flight testing), Radio receivers, Distance-measuring equipment, Air traffic controllers, Accuracy, Navigation computers, Simulation.
Identifiers: VORTAC.

Pictorial displays and course-line computers, driven by VORTAC receivers, were tested to appraise the value of area navigation in the Air Traffic Control System. Technical and operational aspects were tested in fixed-wing aircraft and by simulation in the laboratory. The report touches on results from simulation but concentrates on the description of flight tests. From Air Traffic Control simulations, it was concluded that the controller workload may be reduced and his ability to manipulate traffic increased. Flight tests proved that the addition of area displays to VORTAC receivers enhances the usefulness of DME in VORTAC. Off-radial flight accuracies are comparable to the now existing radial accuracies. (Author)
AD-650 832 HC$3.00 MF$0.65

EVALUATION OF ATCBI-3 TRANSMITTER MODIFICATIONS AND OMNI ANTENNA.
National Aviation Facilities Experimental Center Atlantic City N J
For primary bibliographic entry see Field 17I.
AD-650 834 HC$3.00 MF$0.65

EVALUATION OF SLATE III MARK I.
Final rept.,
National Aviation Facilities Experimental Center Atlantic City N J
Robert A. Waldmann. Nov 65, 31p
FAA-RD-65-135

Descriptors: (*Transponders, *Air traffic control systems), (*Radar beacons, Transmission lines), Operation, Airport radar systems, Transmitter-receivers, Flight testing, Environment, Operation.

An evaluation of a Small Lightweight Altitude Transmission Equipment, SLATE III Mark I was conducted to determine its suitability for operation in present and proposed air traffic control environments. Flight tests were conducted in the Advanced Radar Traffic Control System (ARTS) environment at the Atlanta Terminal Facility, Atlanta, Georgia, and the Stored Program Alpha-Numeric (SPAN) System environment at the Indianapolis Air Route Traffic Control Center, Indianapolis, Indiana. In addition, a short series of bench tests were conducted at the National Aviation Facilities Experimental Center (NAFEC), Atlantic City, New Jersey. It was concluded that the SLATE III Mark I is suitable for operation in present and proposed air traffic control environments. It was recommended the Federal Aviation Agency promote, within the general aviation community, the use of radar beacon transponders having capabilities similar to the SLATE III Mark I.
AD-650 835 HC$3.00 MF$0.65

EVALUATION OF THE ASR VIDEO PHOTOGRAPHIC RECORDING TECHNIQUE.
National Aviation Facilities Experimental Center Atlantic City N J
For primary bibliographic entry see Field 17I.
AD-650 837 HC$3.00 MF$0.65

EXPERIMENTAL TESTING OF THE IMPROVED 3-PULSE INTERROGATION SIDE LOBE SUPPRESSION SYSTEM.
National Aviation Facilities Experimental Center Atlantic City N J
For primary bibliographic entry see Field 17I.
AD-650 840 HC$3.00 MF$0.65

COMMERCIAL INERTIAL NAVIGATION SYSTEM PREDICTED ACCURACY OF THE BANC-461/LN-12 INERTIAL NAVIGATION SYSTEM WHEN INSTALLED IN A DC-8 AIRCRAFT.
Interim rept.
Bendix Corp Teeterboro N J Flight Control Lab
31 Aug 65, 73p Rept no. 7311-66-2R
FAA-RD-65-126
Contract FA-64-WA-5208

Descriptors: (*Inertial navigation, *Commercial planes), Errors, Airborne, Accuracy, Instrumentation, Navigation computers, Position finding, Mathematical prediction, Automatic navigators, Automatic pilots, Mathematical models, Numerical analysis, Performance (Engineering), Jet transport planes.
Identifiers: DC-8 aircraft.

The report presents the results of an error analysis study (using a mathematical model) of the BANC 461/LN-12 Inertial Navigation System installed in a DC-8 aircraft. This study was undertaken to describe the theoretical performance of the first automatic autopilot coupled inertial navigation system installed in a commercial jet aircraft engaged in regular passenger service. Specifications for subsystem error were furnished by the manufacturers; Bendix Corporation and Litton Systems, Inc. The DC-8 airframe/autopilot response was approximated by the turn coordination dynamics. Tracking performance was predicted using the mathematical model and numerical analysis techniques. Curves of cross-track and along track predicted errors are given for a typical Atlantic crossing leg.
AD-650 859 HC$3.00 MF$0.65

EVALUATION OF RUNWAY LIGHTING SYSTEMS FOR EFFECTIVENESS IN DENSE FOG.
Final rept.,
California Univ Berkeley Inst of Transportation and Traffic Engineering
D. M. Finc, R. Horonjeff, and H. G. Paula. Jan 66, 220p
FAA-RD-65-58
Contract FAA/ARDS-434

Descriptors: (*Runways, Marker lights), (*Marker lights, Effectiveness), (*Fog, Marker lights), All-weather aviation, Visibility, Approach lights, Pilots, Visual perception, Tests.
Identifiers: Evaluation.

Tests of runway lighting systems in dense fog show that an intensity of 200 to 300 cp, now in general use for centerline lights at U.S. airports, is not high enough for effective guidance in a fog density of 1200-ft visual range, day or night. These tests also indicate that in daytime, with a 1200-ft visual range, runway marking is considerably useful to pilots as a supplement to runway lighting. In addition, on the basis of pilots' reactions, the present U.S. standard pattern (3:3:3) for touchdown-zone and centerline lights was found to be more effective than either of two other patterns (3:2:1 and 7:3:1) evaluated. Pilots also preferred a modified version of the present U.S. standard approach-light system. The tests were performed in a specially designed facility using artificially produced fog and a linear scale reduction factor of 1/10. Evaluations were made from pilot observations, as well as photometric-measurement and photographic techniques. The test facilities and methods are described, the test results are presented, and some of the influencing factors, such as background brightness and cockpit cutoff angle, are discussed. In addition, a number of recommendations are made with regard to intensities and photometric distributions for runway lights, and with respect to changes in the present U.S. standard approach light system. (Author)
AD-650 864 HC$3.00 MF$0.65

ALPHA NUMERIC SYMBOL GENERATION EQUIPMENT.
Final rept.,
Hazeltine Corp Little Neck N Y Hazeltine Electronics Div
J. F. O'Connor. Sep 65, 103p
FAA-RD-65-103
Contract FA-WA-4345

Descriptors: (*Air traffic control systems, *Plan position indicators), (*Symbols, Display systems), Generators, Numbers, Radar equipment, Circuits, Radar images, Flight paths.
Identifiers: Alpha-numeric symbols.

Two Alpha Numeric Generator equipments in the FAA Atlanta and Indianapolis Air Traffic Control Centers passed all acceptance tests and are undergoing operation testing. These Alpha Numeric Generators electronically label aircraft radar blips on air traffic controller's displays with identity, altitude, vector, speed, and other data. The use of the Alpha Numeric Generators in the ARTS and SPAN air traffic control systems automates former manual functions of the controllers, reduces the necessary communications with aircraft pilots, and minimizes the possibilities of errors in air traffic control. A summary of development problems and test results on the Alpha Numeric Generators is given. (Author)
AD-650 865 HC$3.00 MF$0.65

EVALUATION OF ILS CHECK LIGHT SYSTEM.
Final rept.,
National Aviation Facilities Experimental Center Atlantic City N J
Richard W. Cleary. Jun 65, 20p
FAA-RD-65-75

Descriptors: (*Instrument landings, *Light), (*Flight testing, *Airports), Runways, Sources, Air traffic control systems, Glide path systems, Radio transmission, Accuracy, Landing lights, Lighting equipment.

An optical system for flight checking the Instrument Landing System (ILS) was evaluated at the National Aviation Facilities Experimental Center in order to determine the utility of such a system as a source of position information during ILS flight checks. Two beams of light were projected. The top edge of one beam was aligned with the ILS glide slope; the right edge of the other beam was aligned with the runway centerline. A flight check aircraft was navigated along these paths by visual reference to the light source. The accuracy with which an observer in the aircraft could identify the centerline and glide path by observing the check light was determined. Although the ILS Check Light System performed in accordance with the original design requirements, it was determined that this system was unsuitable in meeting the new ILS flight check requirements and it was recommended that the system not be adopted for operational use.
AD-650 895 HC$3.00 MF$0.65

EVALUATION OF AN ILS GLIDE SLOPE MONITOR TECHNIQUE USING A MONITOR DETECTOR WITH TWO ANTENNAS.
Interim rept.,
Federal Aviation Agency Kansas City Mo Systems Maintenance Div
William Mumper. Dec 65, 42p
FAA-RD-65-102

Descriptors: (*Glide path systems, Monitors), Performance (Engineering).

The report concerns the installation and evaluation of a newly developed clearance monitor system for standard ILS null reference glide slope. It is designed to provide an indication of the glide slope path width that is independent of snow cover conditions or changes in path angle. With minor exceptions, the test monitor system performed in the manner predicted. These exceptions relate principally to the detector point location in the near field, but do not derogate the system's application. This report finds that the proposed monitor system is superior to the present monitor system. It finds the principal disadvantages are the additional height required for the monitor antenna support and the cost of the additional components required. (Author)
AD-650 897 HC$3.00 MF$0.65

FEASIBILITY TEST OF SEARCH AND RESCUE RADIO BEACON.
Final rept.,
National Aviation Facilities Experimental Center Atlantic City N J
John H. Torbert, and Francis W. Jefferson. Dec 65, 28p
FAA-RD-65-136

Descriptors: (*Air-sea rescue beacons, *Radio beacons), Communication equipment, Feasibility studies, Radio receivers, Multiple operation, Radio navigation, Radio transmitters, Ultrahigh frequency, Very high frequency, Intensity, Diagrams, Measurement.

The report contains the results of technical test performed on a feasibility model of a dual frequency VHF/UHF Search and Rescue Radio Beacon (SRRB) loaned to the Federal Aviation Agency by Granger Associates of Palo Alto, California. The SRRB was tested at the National Aviation Facilities Experimental Center and at sea off the New Jersey coast, with the assistance of the U. S. Coast Guard, to investigate equipment performance and to evaluate two types of carrier modulation (constant and swept-tone) specially incorporated in the SRRB provided for test. Results of the tests indicated that the concept of a dual-frequency SRRB is feasible for search and rescue operations, that its use would increase the number of search aircraft now available to include all operational military aircraft, and that the swept-tone modulation is most desirable for this application. Recommendations are made for adoption of the swept-tone modulation for emergency use and consideration, in the event of any SRRB development, of a design that would provide simultaneous transmission on both VHF and UHF emergency frequencies as well as sufficient RF power output to take advantage of automatic direction finder capability in military aircraft. Consideration of an investigation of the various AN/ARA antenna configurations existing or under development by the military is also recommended. (Author)
AD-650 898 HC$3.00 MF$0.65

CATEGORY III ALTITUDE MONITOR.
Sierra Research Corp Buffalo N Y
For primary bibliographic entry see Field 1D.
AD-650 917 HC$3.00 MF$0.65

OFFSET MARKER BEACON ANTENNA.
Airborne Instruments Lab Deer Park N Y 3302
For primary bibliographic entry see Field 9E.
AD-650 921 HC$3.00 MF$0.65

IONOSPHERIC REFRACTION EFFECTS ON THE DOPPLER SHIFT OF RADIO TRANSMISSIONS FROM ARTIFICIAL EARTH SATELLITES.
Texas Univ Austin Defense Research Lab 4410
For primary bibliographic entry see Field 20N.
AD-650 985 HC$3.00 MF$0.65

FEASIBILITY OF AREA MAINTENANCE CONCEPT WITH SELF-CONTAINED TEST VEHICLE FOR USE ON LOW COST INSTRUMENT LANDING SYSTEMS.
Final rept.,
Wilcox Electric Co Inc Kansas City Mo 26
David Staehling. Dec 66, 129p
FAA-RD-66-104
Contract FA-65-WA-1272

Descriptors: (*Instrument landings, Instrumentation), (*Air traffic control systems, Maintenance), Terminal flight facilities, Feasibility studies, Test equipment, Costs, Maintenance vehicles.

The report presents the results of a study to determine how a test vehicle might be used to accomplish on-site periodic maintenance on Low Cost ILS equipment. The chief purpose of the vehicle would be to transport test equipment and unit spares to the site in conjunction with the secondary purpose of providing shelter during maintenance. The transportation aspect (area maintenance) was explored in detail. ILS candidate airports were plotted on a map, and a sample maintenance area was studied from a simulated maintenance schedule. It was concluded that the area maintenance system is highly advantageous and should be implemented as soon as an ILS design for this type of maintenance is available. The report includes specifications and guidelines for development of a Low Cost ILS System which is compatible with the area maintenance concept. (Author)
AD-651 026 HC$3.00 MF$0.65

HUMAN FACTORS EVALUATION OF A LARGE SCREEN RADAR DISPLAY.
Final rept.,
National Aviation Facilities Experimental Center Atlantic City N J
Lee E. Paul, and Edward P. Buckley. Mar 67, 36p

FAA-RD-66-105

Descriptors: (*Air traffic control systems, *Plan position indicators), Display systems, Human engineering, Radar images, Air traffic controllers, Flight paths.
Identifiers: Evaluation.

A Controller Decision Evaluation (CODE) experiment was performed to compare a 20-inch horizontal individual display with an 8 by 10 foot Eidophor projected group display in the terminal environment. Sixteen subjects used each display for four 90-minute sessions. No significant differences between displays were found in either the number of conflictions missed or the number of unnecessary control actions taken. It was concluded that there is nothing inherent in the large common display that would preclude it from use as an air traffic control display. A discussion of a number of factors that should be considered in such a use is given. (Author)
AD-651 033 HC$3.00 MF$0.65

VORTAC IDENTIFICATION LIGHT.
Final rept.,
National Aviation Facilities Experimental Center Atlantic City N J
Jack A. Muller. Dec 66, 29p
FAA-RD-66-89

Descriptors: (*Identification lights, Radio navigation), (*Beacon lights, *Radio navigation), Flight testing, Feasibility studies, Night flight, Interference, Effectiveness, Marker lights.
Identifiers: VORTAC.

Flight tests were conducted to determine the feasibility of a VORTAC Identification Light. A standard 300-mm "V" coded beacon, a modified 300-mm "V" coded beacon and condenser-discharge lights were tested independently to determine the maximum range, under VFR, that positive identification of the VORTAC facility could be obtained. It was concluded that a modified 300-mm 'V' coded beacon or strobeacons mounted on the VORTAC counterpoise, or a standard 300-mm 'V' coded beacon or strobeacons mounted below the 12-foot counterpoise level and 30 feet from the counterpoise edge, provided excellent nighttime identification of the facility. Recommendations were made for additional field tests to determine the actual value of the VORTAC Identification Light to the airways navigation system, the cost to install a complete system at desired VOR facilities, the interference with aircraft and highway traffic, and the nuisance factor to inhabitants near VORTAC facilities. (Author)
AD-651 040 HC$3.00 MF$0.65

DALLAS/FT. WORTH REGIONAL AIRPORT SIMULATION STUDY.
Final rept.,
National Aviation Facilities Experimental Center Atlantic City N J
Robert C. Conway. Apr 67, 55p
FAA-RD-67-5

Descriptors: (*Air traffic control systems, Simulation), Texas, Terminal flight facilities, Airports, Control simulators.

Simulation studies of a plan developed for the control of air traffic when a proposed Regional Airport is operational were conducted. The simulation was conducted using the Model A and Model B Dynamic Air Traffic Control Simulators. Six different combinations of runway usage were tested in evaluating the plan. It was concluded that the plan as modified was capable of accommodating the 1980 traffic during a north or south traffic flow. However, during a northwest or southeast traffic flow this capability did not exist. It was also concluded that the location and associated runway alignment of the proposed Regional Airport and the proposed VORTACs were compatible to the overall terminal area IFR traffic flow. It was recommended that consideration be given to using the modified plan for the control of air traffic when the proposed Regional Airport is operational. (Author)
AD-651 158 HC$3.00 MF$0.65

DEVELOPMENT OF PROTOTYPE DOUBLE SIDEBAND DOPPLER VOR TRANSMITTER AND CARRIER MODULATOR.
Final rept.,
Wilcox Electric Co Inc Kansas City Mo 26
Harold G. Boone. Dec 65, 65p
FAA-RD-65-44
Contract FA-WA-4646

Descriptors: (*Radio transmitters, *Doppler navigation), Modulators, Radio navigation, Radio equipment, Doppler systems, Modification kits, Phase-locked systems.

The equipments are for use in a Doppler VOR ground station. The double-sideband transmitter provides two 50 watt outputs, each phase locked to a carrier transmitter at 9960 cps above or below the carrier frequency. Two separate output stages are automatically frequency controlled by a phase control unit to obtain the two sidebands. The carrier modulator replaces the present conventional VOR modulator and extends the modulation capability down to 30 cps. The modulator is driven by an alternator on the Doppler VOR distributor and controls the phase of the 30 cps modulation signal automatically. The transmitter and modulator were evaluated for performance and the final design passed type tests in accordance with specifications FAA-R-777e, FAA-R-1402 and FAA-R-1403. (Author)
AD-651 160 HC$3.00 MF$0.65

ERROR ANALYSIS OF CELESTIAL-INERTIAL NAVIGATION FOR LOW-THRUST INTERPLANETARY VEHICLES.
IIT Research Inst., Chicago, Ill.
A. L. Friedlander. Apr 67, 86p NASA-CR-740
Contract NAS2-3348

Descriptors: *Celestial navigation, *Inertial navigation, *Interplanetary spacecraft, *Low thrust propulsion, Analysis, Capture, Celestial, Covariance, Earth, Electric, Error, Escape, Flyby, Inertial, Interplanetary, Jupiter (planet), Low thrust, Mars, Mission, Model, Navigation, Orbit, Propulsion, Sensitivity, Spacecraft, Spiral, Statistics, Venus.

For abstract, see STAR 05 11.
N67-21983 HC$3.00 MF$0.65

PASSIVE DAMPING OF THE GENERAL RELATIVITY SATELLITE GYRO.
Illinois Univ., Urbana. Coordinated Science Lab.
T. C. Chen, J. Hsu, and D. Skaperdas. Nov 66, 33p NASA-CR-83569, R-330
Grant NSG-443, Contract DA-28-043-AMC-00073/E/

Descriptors: *Damping, *Gyroscope, *Satellite instrumentation, Alignment, Analysis, Angular, Axis, Axisymmetry, Guidance, Inertial, Instantaneous, Instrumentation, Mathematics, Momentum, Passive, Potential, Satellite, Spherical, Spin, Symmetry, Theory.

For abstract, see STAR 05 11.
N67-23061 HC$3.00 MF$0.65

CENTAUR AC-8 POSTFLIGHT GUIDANCE ANALYSIS.
General Dynamics/Convair, San Diego, Calif.
J. Greenstein, L. Ojeda, R. Wagar, and M. Winkler. 1 Jul 66, 80p NASA-CR-83536, GD/C-BTD66-072
Contract NAS3-8701

Descriptors: *Centaur launch vehicle, *Guidance and control, *Postflight, Accelerometer, Analog, Analysis, Attitude, Computer, Control, Error, Guidance, Hardware, Telemetry, Thrust, Vector, Yaw.

For abstract, see STAR 05 11.
N67-23262 HC$3.00 MF$0.65

ON THE CALCULATION OF AN INERTIAL NAVIGATION SYSTEM.
National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
N. YA. Vovchenko. Dec 66, 13p NASA-TM-X-59482, RSIC-621
Center, Dec. 1966 13 P Refs Transl. Into English From Russian Jointly Supported By Army Missile Command

Descriptors: *Inertial navigation, *Transfer function, Accelerometer, Dynamic, Equation, Function, Gyroscope, Inertial, Navigation, Platform, System, Transfer.

For abstract, see STAR 05 11.
N67-23476 HC$3.00 MF$0.65

17H. OPTICAL DETECTION

HIGH ALTITUDE LIMITATION STUDY ADVANCED HORIZON SENSOR FOR OGO FINAL REPORT, 4 APR. - 15 JUL. 1966.
Advanced Technology Labs., Mountain View, Calif.
R. K. Ronald. 30 Aug 66, 100p NASA-CR-83567, ATD-R-1405
Contract NAS5-9109

Descriptors: *Horizon sensing, *Ogo-a, *Satellite attitude control, Advance, Angle, Attitude, Control, Earth, Geophysics, High altitude, Horizon, Limit, Nonlinearity, Observatory, Orbit, Orbiting geophysical observatory (ogo), Satellite, Sensing, Small.

For abstract, see STAR 05 11.
N67-22257 HC$3.00 MF$0.65

GIANT APERTURE TELESCOPE STUDY PHASE III REPORT.
Perkin-elmer Corp., Norwalk, Conn. Optical Group.
20 Feb 67, 22p NASA-CR-83392, REPT.-8691
Contracts NAS7-100, JPL-951288
Prepared for Jpl

Descriptors: *Aperture, *Communications device, *Cost estimate, *Telescope, Azimuth, Communications, Cost, Device, Elevation, Engineering, Estimate, Optical, Receiver, Steering.

For abstract, see STAR 05 11.
N67-22438 HC$3.00 MF$0.65

SATELLITE TRANSITS RECORDED AT EARLYBURN, OCTOBER TO DECEMBER 1965.
Royal Observatory, Edinburgh (Scotland). Satellite Tracking Div.
For primary bibliographic entry see Field 22B.
For abstract, see STAR 05 11.
N67-22497 HC$3.00 MF$0.65

SATELLITE TRANSITS RECORDED AT EARLYBURN, JANUARY TO MARCH 1966.
Royal Observatory, Edinburgh (Scotland). Satellite Tracking Div.
For primary bibliographic entry see Field 22B.
For abstract, see STAR 05 11.
N67-22499 HC$3.00 MF$0.65

17I. RADAR DETECTION

ON THE EFFECT OF AZIMUTH ON THE ACCURACY OF AN INTERFEROMETER RADAR,
Aerospace Corp., El Segundo, Calif.
C. W. Pittman. Feb 64, 13p TOR-269 (4182)-7
Contract AF 04 (695)-269

Descriptors: (*Doppler radar, *Interferometers), Radar equipment, Range finding, Radar tracking, Radar stations, Azimuth, Velocity, Accuracy, Measurement.

An interferometer radar measures the position and/or velocity of a target by determining the range and/or range rate of the target from a number of tracking stations simultaneously. At least three measurements are required. A coordinate transformation to polar or rectangular coordinates is then performed by a calculation which is geometrically equivalent to finding the point of intersection of three spheres. The angle measurements from the central station (azimuth and elevation) are found to be primarily functions of the range (or range rate) differences between the stations. The GE Mod III guidance system at AMR uses a doppler-measuring interferometer subsystem with three ground stations in an 'L' configuration. (Author)
AD-460 973 HC$3.00

RADAR REFRACTIVE INDEX CALCULATIONS.
Research and development rept.,
David Taylor Model Basin Washington D C
Applied Mathematics Lab
R. P. Eddy. Jul 59, 18p
DTMB-1355

Descriptors: (*Atmospheric refraction, Refractive index), (*Radar signals, Atmospheric refraction), Computer programs, Numerical analysis.

The report presents working formulas for calculating the index of refraction of the atmosphere, and the vertical rate of change thereof, for electromagnetic radiation (radar) at various altitudes. The basic input information is the standard teletyped message ('TEMP' of 'TEMP SHIP') containing, in coded form, the values of pressure, altitude, temperature, and dewpoint temperature at certain standard pressure levels, as obtained from radiosonde observations. (Author)
AD-650 601 HC$3.00 MF$0.65

LOW-COST WEATHER-CONTOURING DEVICE.
Final rept.,
National Aviation Facilities Experimental Center Atlantic City N J
Anthony D. Bradley. Nov 66, 67p
FAA-RD-66-80

Descriptors: (*Meteorological radar, *Air traffic control systems), High altitude, Weather communications, Test equipment (Electronics), Costs, Design, Performance (Engineering), Test methods.

A low-cost weather-contouring device was developed for use by the Air Route Traffic Control Center (ARTCC) high-altitude radar controller. The design and performance characteristics are given and the proposed Electronic Equipment Modification (EEM) are presented. It was concluded that the requirement to present contoured weather to the high-altitude controller positions can be met through the use of this low-cost device; and it was recommended that this operational capability be considered for introduction into the ARTCC as a modification to the RBDE-5 system. (Author)
AD-650 61 HC$3.00 MF$0.65

RADAR OBSERVATIONS OF INSECTS IN FREE FLIGHT.
Environmental Research Papers no. 265,
Air Force Cambridge Research Labs L G Hanscom Field Mass
Kenneth M. Glover, Kenneth R. Hardy, Thomas G. Konrad, W. N. Sullivan, and A. S. Michaels. 1966, 10p Rept no. AFCRL-67-0127
Availability: Published in Science v154 n3752 p967-72 Nov 25 1966.

Descriptors: (*Insects, *Radar tracking), Radar echo areas, Radar reflections, Experimental data, Meteorological phenomena.
Identifiers: Radar angles.

The radar tracking of single insects in the atmosphere leads to distinctive phenomena. (Author)
AD-650 705 Not available from CFSTI.

ARSR WEATHER SURVEILLANCE RADAR KIT.
Final rept.,
Raytheon Co Wayland Mass
Edward H. R. Paro. Oct 65, 46p
FAA-RD-65-114
Contract FA-64-WA-5138

Descriptors: (*Storms, *Radar equipment), (*Weather communications, Environment), Radar clutter, Air traffic controllers, Maintenance, Training, Performance (Engineering), Antennas, Display systems.

The ARSR Weather Surveillance Radar Kit provides the ARSR-1E radar with weather data covering the identical enroute airway area normally covered by the Air Traffic Surveillance Radar. The weather intelligence is in the form of three coded iso-amplitude contours thresholded to display weather amplitude gradients. A circular linear polarizer allowing for two separate and orthogonal outputs provides separation of intelligence. Thus,

in a severe weather environment the weather clutter enters the separate weather kit channel but does not interfere with the normal removal of weather clutter from the main radar channel. The weather signals are processed independently of the radar MTI and normal receivers, however, the kit has the additional advantage of using many of the component types and circuits of the ARSR. This ensures performance reliability, lessens the stocking of spare parts, simplifies maintenance and training, thus reducing repair time. The weather kit prototype model, and the resultant techniques developed for utilizing the display and data will provide the FAA Air Traffic Controller with the ability to route aircraft around or through storm systems in the radar control area.
AD-650 815 HC$3.00 MF$0.65

ATCBI TRANSMITTER SITE IMPROVEMENTS MODEL ATCBI-3.
Whittaker Corp North Hollywood Calif Electronics Div
For primary bibliographic entry see Field 17G.
AD-650 823 HC$3.00 MF$0.65

ATCBI INDICATOR SITE IMPROVEMENTS MODELS ATCBI-2 AND ATCBI-3.
Whittaker Corp North Hollywood Calif Electronics Div
For primary bibliographic entry see Field 17G.
AD-650 824 HC$3.00 MF$0.65

MODIFICATION OF ASR-4 RADAR INDICATOR TO PROVIDE BRIGHT DISPLAY OF RADAR, BEACON, ALPHA-NUMERIC AND SYMBOLIC DATA SPS-A65.
Final rept.,
Texas Instruments Inc Dallas Apparatus Div
John F. Berglund. Mar 65, 87p
FAA-RD-65-42
Contract FA-WA-4178

Descriptors: (*Radar equipment, Display systems), Radar beacons, Airport radar systems, Modification kits.

A five-part kit was designed and developed for field modifying Airport Surveillance Radar ASR-4 indicator subsystems. The kits are designed to provide phased implementation of (1) bright display of radar video, (2) display of a slew dot and generation of beacon readout trigger, (3) display of asynchronous beacon or radar video, (4) display of computer-derived alpha-numeric and symbolic data, and (5) generation of digital message formats for transfer of data to a display computer. These modifications were incorporated into a two-console display subsystem which was successfully tested and installed as a part of the Advanced Radar Traffic Control System (ARTS) at the Atlanta Terminal Area Tower, Atlanta, Georgia. (Author)
AD-650 827 HC$3.00 MF$0.65

EVALUATION OF SFD-315 MAGNETRON AND SOLID STATE DUPLEXER FOR ASDE-2.
Final rept.,
National Aviation Facilities Experimental Center Atlantic City N J
Woodrow R. Applegate. Oct 65, 57p
FAA-RD-65-122

Descriptors: (*Magnetrons, Airport radar systems), (*Radar duplexers, Airport radar systems), Life expectancy, Performance (Engineering), K band, Radar equipment.

The report describes the SFD-315 magnetron and the Solid State Duplexer and presents the results of various tests conducted to appraise their performance. The ASDE-2 at NAFEC was equipped with specially modified modulators for tests of the SFD-315 magnetron. The Solid State Duplexer was operated at an unmodified channel of the radar and performed satisfactorily throughout a life-test period of 2500 hours. It was concluded that satisfactory system performance can not be achieved using the modified modulators provided for operation of the SFD-315 magnetron; however, the SFD-315 magnetron is suitable for ASDE-2 applications with a compatible modulator, and may be expected to operate satisfactorily for more than 5000 hours. It was also concluded that the Solid State Duplexer is a suitable replacement for the original duplexer of ASDE-2. It was recommended that the SFD-315 magnetron not be adopted as a direct replacement for existing ASDE-2 magnetrons but that the Solid State Duplexer be adopted by the FAA as a replacement duplexer for operational ASDE-2 equipments. It was further recommended that procurement specifications for future K-band ASDE radars provide for application of the SFD-315 magnetron or equivalent ICEM type, incorporation of a compatible modulator and a Solid State Duplexer. (Author)
AD-650 833 HC$3.00 MF$0.65

EVALUATION OF ATCBI-3 TRANSMITTER MODIFICATIONS AND OMNI ANTENNA.
Final rept.,
National Aviation Facilities Experimental Center Atlantic City N J
Robert W. Delaney. Nov 65, 94p
FAA-RD-65-127

Descriptors: (*Radar antennas, Radar beacons), (*Omnidirectional antennas, Radar beacons), (*Radar transmitters, Radar beacons), Air traffic control systems, Performance (Engineering), Suppressors, Airport radar systems, Radar equipment, Antenna lobes, Antenna radiation patterns.

The report describes modifications designed to introduce side-lobe suppression (SLS) features, improve the selection and interlacing of interrogation modes, add beacon-sync trigger and mode-trigger output capability, and provide the transmitter with additional pulse power capacity. Emphasis was given to comparison of the design requirements with the actual levels of interrogation-pulse and SLS-pulse power measured during instrumented flights within a representative beacon environment. It was concluded that the design requirements for the prototype modifications are generally valid as a basis for product specifications but must be refined so as to limit the attenuation of SLS pulses within the SLS Crystal Diode Switch. It was also concluded that the modification for additional transmitter power is not required. It was recommended that product specifications be based upon the design requirements along with the additional requirement that the modifications avoid attenuation of SLS pulses more than interrogation pulses. It was further recommended that the transmitter-pulse power amplifier be omitted from the standard modification but that provisions be made for adjustment of the ratio of interrogation-pulse power to SLS-pulse power, over a 3 dB range, when the modifications are installed in the field. (Author)
AD-650 834 HC$3.00 MF$0.65

EVALUATION OF SLATE III MARK I.
National Aviation Facilities Experimental Center Atlantic City N J
For primary bibliographic entry see Field 17G.
AD-650 835 HC$3.00 MF$0.65

EVALUATION OF THE ASR VIDEO PHOTOGRAPHIC RECORDING TECHNIQUE.
Final rept.,
National Aviation Facilities Experimental Center Atlantic City N J
G. Titherington. Aug 65, 36p
FAA-RD-65-99

Descriptors: (*Photographic recording systems, *Airport radar systems), Display systems, Radar equipment, Flight paths, Performance (Engineering), Data, Air traffic control systems, Effectiveness.

Data were obtained by photographing radar presentations at the John F. Kennedy Tower facility during periods of high air traffic activity. Reconstruction of the traffic situations using these photographic records was accomplished by air traffic controllers. Results of data analysis showed that the photographic recording technique incorporating particular equipments and procedures was suitable for recording radar video data and was adequate for re-creating air traffic situations. It was recommended that: (1) an investigation of support requirements be conducted to determine practicability of operational implementation; (2) consideration be given to development of a prototype system; and (3) specifications for prototype equipment include certain listed minimal criteria. (Author)
AD-650 837 HC$3.00 MF$0.65

EXPERIMENTAL TESTING OF THE IMPROVED 3-PULSE INTERROGATION SIDE LOBE SUPPRESSION SYSTEM.
Final rept.,
National Aviation Facilities Experimental Center Atlantic City N J
George F. Spingler. Nov 65, 49p
FAA-RD-65-139

Descriptors: (*Suppressors, Airport radar systems), Antenna lobes, Radar equipment, Radar beacons, Air traffic control systems, Radar reflections.

Experimental testing of an Improved 3-Pulse Interrogation Side Lobe Suppression (SLS) System was conducted to determine system performance characteristics and suitability for operational use. The Improved 3-Pulse SLS System was designed to increase the signal level of the first interrogation pulse (P sub 1) received by an aircraft transponder and thereby minimize transponder replies to interrogations from reflections. A method of transmitting the interrogation pulse from the Radar Beacon System omni-directional and directional antenna was developed. The proper interrogation pulse level required to be radiated from the omni-directional antenna to obtain proper suppression of reflected replies was determined by tests. In addition, the adaptability of the modified Air Traffic Control Beacon Interrogation Transmitter (ATCBI-3) to the Improved 3-Pulse SLS System was also analyzed and a field trial of the system was accomplished. It was concluded that the Improved 3-Pulse SLS System is effective in reducing the quantity of transponder replies to interrogations resulting from reflections and is suitable for application in the Air Traffic Control Radar Beacon System. (Author)
AD-650 840 HC$3.00 MF$0.65

EVALUATION OF AIR TRAFFIC CONTROL RADAR WEATHER DATA.
Interim rept.,
National Aviation Facilities Experimental Center Atlantic City N J
Anthony D. Bradley. Oct 65, 58p
FAA-RD-65-121

Descriptors: (*Meteorological radar, *Radar clutter), (*Air traffic control systems, *Storms), Video signals, Calibration, Polarization, Performance (Engineering), Antennas, Operation.

A Technical Evalustion of the ARSR Weather Surveillance System, Type FAA-ER-240-003, was conducted at the ARSR-1E Facility, Suitland, Maryland, and the Washington ARTCC, Leesburg, Virginia, to determine a system performance level which would permit an effective Operational Evaluation. The ARSR Weather Surveillance System, Type FAA-ER-240-003, purchased from the Raytheon Company, Wayland, Massachusetts, under Contract FA WA-5138, was designed to

process weather information received as RF signals at the ARSR-1E antenna and present three distinct iso-amplitude contours of the weather on the Air Traffic Controller's display. An investigation designed to examine the various aspects of the equipment's performance constituted the Technical Evaluation. The ATC Channel circular polarization punch-through level was measured along with the peak intensity of a storm. Contoured weather presentations were photographed and compared with the U. S. Weather Bureau WSR-57 information. It was concluded that a solid line contour, 7 db above the minimum discernible signal and the application of an MSTC-R3 sensitivity variation with range established in acceptable system performance level for presenting weather information. The ARSR Weather Surveilance System is suitable for use in conducting an Operational Evaluation. In addition, improvements can be achieved in several system areas. It was recommended that the Operational Evaluation proceed under established operating conditions. It was further recommended that improvements be accomplished in several system areas.
AD-650 858 HC$3.00 MF$0.65

ALPHA NUMERIC SYMBOL GENERATION EQUIPMENT.
Hazeltine Corp Little Neck N Y Hazeltine Electronics Div
For primary bibliographic entry see Field 17G.
AD-650 865 HC$3.00 MF$0.65

INTERFERENCE REDUCTION EQUIPMENT, TRANSMITTER FIXES.
National Aviation Facilities Experimental Center Atlantic City N J
For primary bibliographic entry see Field 17B.
AD-650 915 HC$3.00 MF$0.65

HUMAN FACTORS EVALUATION OF A LARGE SCREEN RADAR DISPLAY.
National Aviation Facilities Experimental Center Atlantic City N J
For primary bibliographic entry see Field 17G.
AD-651 033 HC$3.00 MF$0.65

FUNDAMENTALS OF THE THEORY OF DETECTION OF RADAR SIGNALS AND MEASUREMENT OF THEIR PARAMETERS,
Foreign Technology Div Wright-Patterson AFB Ohio
Ya. D. Shirman, and V. N. Golikov. 25 Jan 67, 394p Rept no. FTD-HT-66-256 TT-67-61671
Unedited rough draft trans. of mono. Osnovy Teorii Obnaruzheniya Radiolokatsionnykh Signalov i Izmereniya ikh Parametrov, Moscow, 1963 278p.

Descriptors: (*Radar signals, Detection), USSR, Theory, Probability, Signal-to-noise ratio, Statistical analysis, Noise (Radar).

The book deals with the basic aspects of the statistical theory of detecting radar signals and measuring their parameters in the presence of Gaussian interferences, gives the theory and the principles of designing devices with optimum detection and measuring as well as a great number of examples permitting the reader to familiarize himself more quickly with the main problems of the theory and its applications. (Author)
AD-651 073 HC$3.00 MF$0.65

18. NUCLEAR SCIENCE AND TECHNOLOGY

18A. FUSION DEVICES (THERMONUCLEAR)

WEAK TURBULENCE IN A HOMOGENEOUS PLASMA,
Princeton Univ., N. J. Plasma Physics Lab.
Ronald C. Davidson. Nov 66, 140p
Contract AT (30-1)-1238

Descriptors: (*Plasma physics, Turbulence), (*Thermonuclear reactions, Plasma medium), Kinetic energy, Excitation, Stability.

For abstract, see NSA 21 09.
MATT-496 HC$3.00 MF$0.65

CALCULATION OF TOROIDAL MAGNETIC FIELD CONFIGURATIONS,
California Univ., Livermore, Lawrence Radiation Lab.
John Killeen, Harold P. Furth, and Robert P. Frets. 10 Jan 67, 60p
Contract W-7405-eng-48

Descriptors: (*Magnetic fields, Configura on), (*Thermonuclear reactions, Computer programs), Programming languages.

For abstract, see NSA 21 09.
UCRL-50161 HC$3.00 MF$0.65

18B. ISOTOPES

PLUTONIUM ABSTRACTS. VOLUME 6, NUMBER 11.
Battelle-Northwest, Richland, Wash., Pacific Northwest Lab.
For primary bibliographic entry see Field 7D.
For abstract, see NSA 21 09.
BNWL-113-23 HC$3.00 MF$0.65

BASIC STUDIES IN RADIATION TECHNOLOGY.
Final rept., 1 Nov.61-30 Apr 66.
Johnston, William H. Labs., Inc., Baltimore, Md. 30 Apr 66, 257p
Contract AT (30-1)-2901

Descriptors: (*Radiation chemistry, Chemical industry), (*Nuclear industrial applications, Chemical engineering).

For abstract, see NSA 21 09.
JLI-2901-75 HC$3.00 MF$0.65

STABLE GASEOUS ISOTOPE SEPARATION AND PURIFICATION, APRIL-JUNE 1966,
Mound Lab., Miamisburg, Ohio.
G. R. Grove. 30 Jun 66, 42p
Contract AT-33-1-GEN-53

Descriptors: (*Isotope separation, *Isotope impurities), (*Gaseous diffusion separation, Stability).

For abstract, see NSA 21 09.
MLM-1353 HC$3.00 MF$0.65

A PROGRAM FOR CALCULATING OPTIMUM DIMENSIONS OF ALPHA RADIOISOTOPE CAPSULES EXPOSED TO VARYING STRESS AND TEMPERATURE.
Oak Ridge National Lab., Tenn.
J. P. Nichols, and D. R. Winkler. Apr 67, 76p
NASA-CR-72172, ORNL-TM-1735
Contract W-7405-ENG-26
Sponsored By Nasa

Descriptors: *Alpha radiation, *Computer program, *Creep, *Radioactive isotope, Alloy, Alpha, Computer, Effect, Isotope, Niobium, Optimization, Power, Program, Radiation, Radioactivity, Space, Stainless, Steel, Stress, Supply, Temperature, Zirconium.

For abstract, see STAR 05 11.
N67-22067 HC$3.00 MF$0.65

COMPILATION OF UNITED STATES NUCLEAR STANDARDS. 3RD EDITION, 1966.
Oak Ridge National Lab., Tenn.
For primary bibliographic entry see Field 6R.
For abstract, see NSA 21 09.
ORNL-NSIC-30 HC$3.00 MF$0.65

18C. NUCLEAR EXPLOSIONS

SITE-SELECTION INVESTIGATIONS. PROJECT PRE-GONDOLA,
Army Engineer Nuclear Cratering Group, Livermore, Calif.
H. A. Jack, and W. W. Dudley. Feb 67, 45p
Contract W-7405-eng-48
Prepared in cooperation with Army Engineer District, Omaha, Nebr.

Descriptors: (*Nuclear explosions, *Cratering), (*Site selection, Shale), Rock (Geology), Sedimentary rock.

For abstract, see NSA 21 09.
PNE-1101 HC$3.00 MF$0.65

MACRODEFORMATION RESULTING FROM THE HANDCAR EVENT,
California Univ., Livermore, Lawrence Radiation Lab.
For primary bibliographic entry see Field 8G.
For abstract, see NSA 21 09.
UCRL-50149 HC$3.00 MF$0.65

A MEASUREMENT OF THE VOLUME OF VOID IN THE SHOAL CHIMNEY,
California Univ., Livermore. Lawrence Radiation Lab.
Charles R. Boardman. 27 Sep 66, 12p
Contract W-7405-eng-48

Descriptors: (*Nuclear explosions, Rock (Geology)), Injection, Containers, Time, Pressure, Degradation.

For abstract, see NSA 21 09.
UCRL-50150 HC$3.00 MF$0.65

18D. NUCLEAR INSTRUMENTATION

URANIUM MICROMAPS: TECHNIQUE FOR IN SITU MAPPING OF DISTRIBUTIONS OF FISSIONABLE IMPURITIES,
California Inst of Tech Pasadena
Robert L. Fleischer. 15 Aug 66, 2p
Contract Nonr-220 (47), Grant NSF-GP-5391
Availability: Published in Review of Scientific Instruments v37 n12 p1738-9 Dec 1966.

Descriptors: (*Uranium, Distribution), (*Radiation measurement systems, Films), (*Autoradiography, Solids), Impurities, Nuclear radiation, Particle trajectories, Mapping, Neutron reactions.

A method is described of in situ mapping of fissionable impurities in solids which leaves a transparent map overlay on the mapped material--allowing the specific locations of the uranium (or other fissionable element) to be identified. The method in principle involves placing and keeping in place during irradiation and etching a thin film of detector.
AD-650 678 Not available from CFSTI.

COSMIC RAY.
Final rept., 23 Jan 66-23 Jan 67,

Bendix Corp Ann Arbor Mich Aerospace Systems Div
Kendle M. Wainio, Theodore H. Colvin, Keith A. Moore, and Otho L. Tiffany. 23 Feb 67, 64p
Rept no. BSR-2018
AFCRL-67-0149
Contract AF 19 (628)-5840

Descriptors: (*Cosmic rays, *Radiation measurement systems), Neutron counters, Neutron flux, Count-rate meters, Energy, Monte Carlo method, Probability.

Results of calculations to determine specific yield functions for IGY neutron monitors are reported for vertically incident cosmic ray protons in the range of $1 < Pc < 6$ Gv. The Monte Carlo method is used to calculate secondary nucleon flux intensities at atmospheric depths of 312, 680, and 1000 g/sq cm. Experimental data on neutron monitor response are employed to relate the calculated flux data on count rates, and hence to specific yields, at the corresponding depths. Comparison with empirical data for the specific yield function at sea level shows fair agreement for rigidities less than 3 Gv, but calculated yields are considerably smaller than the empirical data at higher rigidities. Various possible explanations for the discrepancy are discussed. At this time, the most probable cause appears to be the assumption that vertically incident cosmic rays produce most of the counts registered by neutron monitors. (Author)
AD-650 687 HC$3.00 MF$0.65

BUBBLE CHAMBERS, 1964-1966,
Argonne National Lab., Ill.
M. Derrick. Oct 66, 49p
Conf.-660918-17
Contract W-31-109-eng-38
Prepared for presentation at International Conference on Instrumentation for High Energy Physics, Stanford, Calif.

Descriptors: (*Bubble chambers, Symposia), (*Radiation measurement systems, Tables), Instrumentation, Illumination, Photography.

For abstract, see NSA 21 09.
ANL-7265 HC$3.00 MF$0.65

STATIC GAS COUNTERS FOR INIMICAL GASES,
Brookhaven National Lab., Upton, N. Y.
David R. Christman. Nov 66, 8p
Contract AT (30-2)-GEN-16

Descriptors: (*Gases, Radioactive isotopes), (*Counting methods, *Radiation measurement systems).

For abstract, see NSA 21 09.
BNL-50028 HC$3.00 MF$0.65

UNIQUE DETERMINATION OF EDDY CURRENT FLOW PATTERNS FROM MEASUREMENT OF EXTERNAL FIELDS,
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
M. J. Churchill. Feb 67, 9p
Contract AT (45-1)-1830

Descriptors: (*Field theory, Non-destructive testing), (*Defects (Materials), Electromagnetic fields).

For abstract, see NSA 21 09.
BNWL-364 HC$3.00 MF$0.65

SOLID-STATE PLUG-IN CIRCUITS AS INSTRUMENT BUILDING BLOCKS,
DuPont de Nemours (E.I.) and Co., Aiken, S. C. Savannah River Lab.
W. J. Woodward. Jan 67, 16p
Contract AT (07-2)-1

Descriptors: (*Solid state physics, Circuits), (*Instrumentation, Reliability (Electronics)).

For abstract, see NSA 21 09.
DP-1079 HC$3.00 MF$0.65

DEVELOPMENT OF NEUTRON SPECTROMETRY FOR CRITICAL ASSEMBLIES.
Quarterly rept. no. 1, 20 Jun-31 Dec 66,
ITT Research Inst., Chicago, Ill.
Robert B. Moler, and William E. Zagotta. 26 Jan 67, 37p
Contract AT (11-1)-578

Descriptors: (*Critical assemblies, *Nuclear radiation spectrometers), Detectors, Efficiency, Proportional counters, Radiation measurement systems.

For abstract, see NSA 21 09.
IITRI-578P31-1 HC$3.00 MF$0.65

LINEAR-MOTION BENT-CRYSTAL GAMMA-RAY SPECTROMETER,
Idaho Nuclear Corp., Idaho Falls, Utah State Univ., Logan.
O. H. Otteson, and W. F. Edwards. Jan 67, 56p
Contract AT (10-1)-1230
Prepared in cooperation with Utah State Univ., Logan.

Descriptors: (*Nuclear radiation spectrometers, Design), Construction, Calibration, Line spectrum, Crystals, Germanium, Quartz, Gamma rays.

For abstract, see NSA 21 09.
IN-1025 HC$3.00 MF$0.65

BASIC STUDIES IN RADIATION TECHNOLOGY.
Johnston, William H. Labs., Inc., Baltimore, Md.
For primary bibliographic entry see Field 18B.
For abstract, see NSA 21 09.
JLI-2901-75 HC$3.00 MF$0.65

GAMMA SPECTROMETRY WITH SEMICONDUCTOR DETECTORS.
Gamma-spektrometrie Mit Halbleiterdetektoren
Kernforschungsanlage, Juelich (West Germany). Institut Fuer Reaktorbauelemente.
H. Petri, and G. Riepe. Oct 65, 18p JUL-308-RB
in German, English Summary

Descriptors: *Gamma radiation, *Germanium compound, *Sodium iodide, Activation, Compound, Counter, Crystal, Detector, Drift, Gamma, Germanium, Iodide, Lithium, Mass, Nuclear, Performance, Radiation, Scintillator, Semiconductor, Sodium, Spectrometry, Thallium.

For abstract, see STAR 05 11.
N67-22139 HC$3.00 MF$0.65

MEASUREMENT OF NEUTRON FLUENCE BY FISSION FRAGMENT DAMAGE TRACK DETECTION.
Atomic Energy of Canada, Ltd., Chalk River (Ontario).
R. C. Bhatt. Aug 66, 31p AECL-2657

Descriptors: *Glass, *Mica, *Neutron flux, *Radiation detector, *Radiation hazard, Damage, Detector, Dosimetry, Fission, Flux, Neutron, Phosphate, Product, Radiation, Silicate, Thermal.

For abstract, see STAR 05 11.
N67-22478 HC$3.00 MF$0.65

THE BR2 TESTING REACTOR AND ITS CONNECTED LABORATORIES ANNUAL PROGRESS REPORT, 1965.
Centre D Etude de L Energie Nucleaire, Mol (Belgium).
For primary bibliographic entry see Field 18M.
For abstract, see STAR 05 11.
N67-22921 HC$3.00 MF$0.65

A QUICK RESPONSE IONIZATION SURVEY-METER.
Japan Atomic Energy Research Inst., Ibaraki.
T. Tomura. Jan 66, 16p NSJ-TR-3, REV.
Submitted for Publication Revised

Descriptors: *Alpha radiation, *Ionization gauge, Air, Alpha, Amplifier, Capacity, Circuit, Contamination, Dose, Feedback, Gamma, Gauge, Ionization, Radiation, Response.

For abstract, see STAR 05 11.
N67-22975 HC$3.00 MF$0.65

ROTATING CRYSTAL SPECTROMETERS WITH AND WITHOUT AN AUXILIARY DEVICE FOR SUPPRESSION OF UNWANTED REFLEXIONS.
Oesterreichische Studiengesellschaft Fuer Atomenergie G.M.B.H., Seibersdorf.
For primary bibliographic entry see Field 14B.
For abstract, see STAR 05 11.
N67-22980 HC$3.00 MF$0.65

FABRICATION OF A SPARK CHAMBER WITH MAGNETOSTRICTIVE WIRE FOR USE WITH A PARTICLE HDOSCOPE.
Realizzazione Di Una Camera A Scintille Con Filo Magneto Strittivo Da Usare Come Odoscopio Di Particelle
Comitato Nazionale Per L Energia Nucleare, Frascati (Italy). Lab. Nazionali Di Frascati.
C. Guaraldo, C. Mancini, P. Picozza, C. Schaerf, and R. Scrimaglio. 6 Dec 66, 10p LNF-66/62
in Italian Its Nota Interna No. 339

Descriptors: *Magnetostriction, *Spark chamber, Chamber, Charged particle, Helium, Path, Retardation, Spark, Spark gap, Speed, Tension, Trigger, Variation, Voltage, Wire.

For abstract, see STAR 05 11.
N67-23017 HC$3.00 MF$0.65

A HIGH DISSIPATION SPECTROMETER FOR VERY SLOW NEUTRONS FOR THE APPLICATION TO THE COLD SOURCE OF A MAXIMUM FLUX REACTOR.
Ein Hochaufloesendes Spektrometer Fuer Sehr Langsame Neutronen Zur Verwendung An Der Kalten Quelle Eines Hoechstflussreaktors
Kernforschungsanlage, Juelich (West Germany). Inst. Fuer Neutronenphysik.
R. Scherm. Aug 65, 26p JUL-295-NP
in German

Descriptors: *Neutron scattering, *Slow neutron, *Spectrometer, Chopper, Cold, Crystal, Disk, Flux, High resolution, Impulse, Neutron, Nuclear, Observation, Reactor, Rotation, Scattering, Slow, Source.

For abstract, see STAR 05 11.
N67-23034 HC$3.00 MF$0.65

DISASSEMBLY AND SAMPLING OF GRAPHITE BALL FUEL ELEMENTS.
Kernforschungsanlage, Juelich (West Germany). Laboratorium Fuer Radioaktive Festkoerper.
For primary bibliographic entry see Field 18J.
For abstract, see STAR 05 11.
N67-23065 HC$3.00 MF$0.65

SPHERE TECHNIQUES FOR MEASURING FLUX DENSITIES AND DOSE RATES OF THERMAL, INTERMEDIATE AND FAST NEUTRONS.
Kugeltechniken Zur Messung Von Flussdichte Und Dosisleistungen Thermischer, Intermediaer Und Schneller Neutronen
Kernforschungsanlage, Juelich (West Germany). Zentralabteilung Strahlenschutz.
D. Nachtigall, and F. Rohloff. Nov 64, 53p JUL-213-ST
in German, English Summary

Descriptors: *Dosage, *Flux density, *Neutron emission, *Radiation measurement, *Sphere, Counter, Crystal, Density, Emission, Fast, Flux, Intermediate, Measurement, Neutron, Polyethylene, Radiation, Scintillation, Thermal.

For abstract, see STAR 05 11.
N67-23075 HC$3.00 MF$0.65

CONTEMPORARY PROCESSES OF SPECTROSCOPY OF FAST NEUTRONS USING THRESHOLD VALUE PROBES.
Gegenwaertige Verfahren Zur Spektroskopie Schneller Neutronen Mit Hilfe Von Schwellwertsonden
Kernforschungsanlage, Juelich (West Germany). Zentralinstitut Fuer Reaktorexperimente.
L. Weise. Oct 62, 52p JUL-414-RX
in German

Descriptors: *Fast neutron, *Neutron spectrometry, *Threshold detector, Accuracy, Activation, Application, Bibliography, Cross section, Detector, Energy, Excitation, Fast, Function, Mathematics, Measurement, Method, Neutron, Probe, Reactor, Spectrometry, Spectrum, Threshold, Value.

For abstract, see STAR 05 11.
N67-23091 HC$3.00 MF$0.65

METHODS TAKING ACCOUNT OF COULOMB SCATTERING AND BREMSSTRAHLUNG FOR BUBBLE CHAMBER TRACKS TREATMENT.
Metody Ucheta Kulonovskogo Rasseyaniya I Tormoznogo Izlucheniyapri Obrabotke Kamernykh Trekov
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Problems.
YU. A.Budagov, V. B. Vinogradov, and A. G. Volodko. 1966, 37p JINR-P10-3021
in Russian

Descriptors: *Bremsstrahlung, *Bubble chamber, *Coulomb potential, *Kinematics, Bubble, Chamber, Computer, Least, Matrix, Method, Parameter, Pion, Program, Scattering, Square, Track.

For abstract, see STAR 05 11.
N67-23214 HC$3.00 MF$0.65

ELECTRONIC SAFETY DEVICES WITH MU A READINGS FOR SEMICONDUCTOR DETECTORS.
Elektronische Sicherung Mit Mu A Anzeige Fuer Halbleiterdetektoren
Kernforschungszentrum, Karlsruhe (West Germany). Institut Fuer Experimentelle Kernphysik.
J. Kind. Mar 66, 15p KFK-426
in German

Descriptors: *Current distribution, *Safety device, *Semiconductor device, Control, Current, Detector, Device, Distribution, Electronic, Equipment, Fuse, Operation, Protection, Range, Safety, Semiconductor.

For abstract, see STAR 05 11.
N67-23215 HC$3.00 MF$0.65

THE CHANGERS OF TIME CONSTANT IN THE FILTERS OF DC LOGARITHMIC PERIODMETER - RESULTS AND POSSIBILITIES (1964).
Variation des Constantes de Temps de Filtrage Dans les Periodemetres Logarithmiques - Resultats Et Possibilites (964)
Commissariat A L Energie Atomique, Saclay (France).
C. Faraguet, and R. Quenee. Jan 66, 41p CEA-R-2940, PB-169534
in French

Descriptors: *Filter, *Time constant, Circuit, Constant, Electronics, Fission, Ionization chamber, Meter, Neutron, Period, Reactor, Time.

For abstract, see STAR 05 11.
N67-23376 HC$3.00 MF$0.65

TRANSIENT RADIATION EFFECTS ON THERMOCOUPLES.
Cincinnati Univ., Ohio.
J. S. Crutchfield, and J. H. Leonard. 1966, 18p
NASA-CR-83079
Contract NGR-36-004-014
Presented At Winter Meeting, Am. Nucl. Soc., Pittsburgh, 30 Oct. - 3 Nov. 1966

Descriptors: *Radiation effect, *Thermocouple, *Transient response, Effect, Material, Measurement, Output, Radiation, Reactor, Response, Thermoelectric, Transient, Voltage.

For abstract, see STAR 05 11.
N67-23465 HC$3.00 MF$0.65

STANDARDS OF PERFORMANCE FOR FILM BADGE SERVICES,
National Sanitation Foundation, Ann Arbor, Mich.
Donald E. Barber. Sep 66, 59p
PHS-999-RH-20
Contract PHS-86-63-198

Descriptors: (*Dosimeters, *Standards), (*Radiation monitors, *Control), Measurement, Errors, Exposure, Tests, Accuracy.

Standards of performance for film badge services are of general concern to film badge services, users of these services, and regulatory agencies. A quality control program self-imposed by film badge services, but involving all of these groups, is described. Approximately 2,000 film badges were irradiated with various types and energies of radiation. Exposures ranged from 0.002 to 497 roentgens. Film badge services helped design the test procedures, submitted badges for exposure, interpreted exposures, and assisted in determining provisional performance control limits. All services were informed of the test procedures to be used in the test. These error factors are tabulated to show the accuracy of the film badge services tested. Frequency distributions of the error factors served as the basis for selection of control limits used to define acceptable performance. Administrative procedures for periodically evaluating film badge service performance and for recognizing acceptable performance are also described. (Author)
PB-174 452 HC$3.00 MF$0.65

MESURE DE FLUX DE NEUTRONS EN RALENTISSEMENT AU MOYEN DE DETECTEURS EN SANDWICHES Au-La-Co-Mn (Measurement of Moderated Neutron Fluxes using Au-La-Co-Mn Sandwich Detectors),
Commissariat a l'Energie Atomique, Fontenay-Aux-Roses (France). Centre d'Etudes Nucleaires.
Laurent Costa. Mar 67, 101p CEA-R-3200
Text in French; attached summary in English.

Descriptors: (*Neutron flux, Measurement), (*Neutron detectors, Laminates), Gold, Lanthanum, Cobalt, Manganese, Sandwich construction, Neutron activation, Anisotropy, Doppler effect, Temperature, Nuclear resonance, Diffusion, France.

In order to measure the energy spectra of moderated neutrons in reactors or their protections, it is possible to improve resonating detectors by using three together: the difference between the activities of the exterior detectors and that of the central detector is proportional to the neutron flux at the resonance energy. The sensitivity obtained is lower but the energy selectivity is better than with simple detectors. The object of this work has been to develop this technique for four substances: gold, lanthanum, cobalt and manganese which have resonance energies of 4.9 - 73.5 - 132 and 337 eV. (Author)
PB-174 567 HC$3.00 MF$0.65

MESURE ABSOLUE D'UN FLUX ETALON DE NEUTRONS THERMIQUES PAR ACTIVATION DE DETECTEURS D'OR (Absolute Measurement of a Standard Thermal-Neutron Flux using Gold-Detector Activation),
Commissariat a l'Energie Atomique, Fontenay-Aux-Roses (France). Centre d'Etudes Nucleaires.
Yves Paternot. Feb 67, 103p CEA-R-3166
Text in French; attached summary in English.

Descriptors: (*Neutron flux, Measurement), (*Neutron detectors, Operation), (*Neutron activation, Instrumentation), Cadmium, Gold, Radioactivation analysis, Gamma emission, Beta decay, Pions, Coincidence counting, Nuclear reactors, Standards, France.

The density of neutrons in a standard pile was determined between the zero-energy and the cut-off energy of 1 mm thick cadmium unit using a gold detector. Its absolute activity was measured using a 4 pi beta counter calibrated for 4 pi beta, gamma coincidence by counting strongly active sources. The correction factor F due to the disintegration process for the gold was determined experimentally. (Author)
PB-174 572 HC$3.00 MF$0.65

REALISATION D'UN EMSEMBLE D'ANALYSE BIPARAMETRIQUE. APPLICATION A L'ETUDE DE LA DESINTEGRATION DU NIVEAU DE 16, 11 MeV DU 12C (Construction of a Biparametric Analysis System. Application to the Study of the Break-Up of the 16. 11 MeV Energy Level of 12C).
Doctoral thesis in French,
Commissariat a l'Energie Atomique, Grenoble (France). Centre d'Etudes Nucleaires.
Hans-Dieter Engelhardt. 5 Nov 66, 63p CEA-R-3160
Text in French; attached summary in English.

Descriptors: (*Coincidence counting, Instrumentation), (*Alpha decay, *Nuclear spectroscopy), (*Carbon, *Nuclear energy levels), Boron, Proton bombardment, Radioactive decay, Decay schemes, Nuclear radiation spectrometers, Construction, France.

A biparametric analysis system was assembled to measure alpha-alpha spectra in coincidence. The correlations in energy and angle of the alpha-particles emitted from the reaction 11B (p,alpha) were studied using 163 keV protons produced by a Van-de-Graaff accelerator. Evidence was obtained for the sequential decay of 12C* (16, 11 MeV) via the 0 (+) and 2 (+) states of 8Be. Contributions from the 8Be* (4 (+)) level or from the simultaneous break-up of 12C* (16, 11 MeV) into three alpha-particles cannot be excluded. (Author)
PB-174 578 HC$3.00 MF$0.65

18F. RADIATION SHIELDING AND PROTECTION

GAMMA-RAY TRANSMISSION THROUGH FINITE SLABS,

Rand Corp., Santa Monica, Calif.
G. H. Peebles. 1 Dec 52, 195p R-240

Descriptors: (*Gamma rays, Attenuation), (*Photon bombardment, Attenuation), Iron, Lead, Thickness, Shielding, Energy, Gamma-ray scattering, Air, Compton scattering, Backscattering.

The quantity which is considered in this report to be of first importance is the build-up factor for a monoenergetic, monoangular beam of photons incident on a slab of finite thickness but infinite extent. This quantity is obtained for a set of discrete values of slab thickness, of incident energy, and of incident angle. Slab thickness, in mean free paths, spans the interval (0, 20); incident energy, in units of m (c sq), the interval (1, 20); and incident angle, in degrees, the interval (0, 90). Two materials are used for the slab--lead and iron. The processes used to obtain the set of 'build-up' factors and to establish their accuracy within ressonable limits are such that a considerable amount of supplementary information is produced. This information is also presented. The supplementary results consist in the probabilities and expected energies corresponding to the transmission of photons with exactly one, two, or three scatterings; distributions of the transmitted photons over energy and angle; some results for slabs of air and of the pure Compton scatterer; some build-up factors in an energy range just below that stated above; photon and energy densities for three source configurations; and other quantities which on occasion might prove interesting or useful. Also, a discussion of the effect of variation of the total absorption coefficient on transmission probabilities is given which leads to estimates of build-up factors for a material of arbitrary atomic number Z. (Author)
AD-8200 HC$3.00

EFFECTIVE TWO-GROUP GAMMA-RAY SPECTRA FOR THERMAL NEUTRON CAPTURE AND PROMPT FISSION.
Los Alamos Scientific Lab., N. Mex.
Donald J. Dudziak. Oct 66, 64p
Contract W-7405-eng-36

Descriptors: (*Thermal neutrons, *Neutron capture), (*Gamma-ray spectra, Uranium), Radioactive isotopes, Reactor shielding materials, Fast reactors, Reactor shielding calculations.

For abstract, see NSA 21 09.
LA-3619 HC$3.00 MF$0.65

IMPROVING ECONOMY WITH THE USE OF STANDARDIZED, MOVABLE, IN-CELL BOXES, AND THE DECONTAMINATION OF THEIR EQUIPMENT AT THE CENTRAL DECONTAMINATION FACILITY.
Kernforschungsanlage, Juelich (West Germany). Laboratorium Fuer Radioaktive Festkoerper.
G. Brinkmann, W. Schenk, W. Schulz, and F. Stockschlaeder. Apr 65, 16p JUL-252-RW
Its Paper No. 38

Descriptors: *Decontamination, *Economics, *Nuclear research, *Research facility, Box, Cell, Equipment, Facility, Improvement, Nuclear, Planning, Research, Standardization.

For abstract, see STAR 05 11.
N67-22440 HC$3.00 MF$0.65

DISASSEMBLY OF TEST IRRADIATIONS AND FUEL ELEMENTS IN SMALL CAST IRON, ALPHA-GAMMA-CELLS AND THEIR SUBSEQUENT HANDLING.
Kernforschungsanlage, Juelich (West Germany). Laboratorium Fuer Radioaktive Festkoerper.
P. J. Schmiddem, W. Stephan, and K. Zamja. Apr 65, 20p JUL-253-RW

Descriptors: *Fuel element, *Iron, *Irradiation, Alpha, Cell, Gamma, Reactor, Seal, Test.

For abstract, see STAR 05 11.
N67-22467 HC$3.00 MF$0.65

PACKAGING DISASSEMBLED FUEL ELEMENTS AND RADIOACTIVE WASTE IN THE HOT CELLS AT THE KERNFORSCHUNGSANLAGE, JUELICH.
Kernforschungsanlage, Juelich (West Germany). Laboratorium Fuer Radioaktive Festkoerper.
For primary bibliographic entry see Field 18G.
For abstract, see STAR 05 11.
N67-23066 HC$3.00 MF$0.65

COMPILATION OF UNITED STATES NUCLEAR STANDARDS. 3RD EDITION, 1966.
Oak Ridge National Lab., Tenn.
For primary bibliographic entry see Field 6R.
For abstract, see NSA 21 09.
ORNL-NSIC-30 HC$3.00 MF$0.65

18G. RADIOACTIVE WASTES

PACKAGING DISASSEMBLED FUEL ELEMENTS AND RADIOACTIVE WASTE IN THE HOT CELLS AT THE KERNFORSCHUNGSANLAGE, JUELICH.
Kernforschungsanlage, Juelich (West Germany). Laboratorium Fuer Radioaktive Festkoerper.
J. Rau, A. Retz, P.-J. Schmiddem, and W. Stephan. Apr 65, 24p JUL-249-RW

Descriptors: *Container, *Fuel element, *Packaging, *Plastic material, *Radioactive waste, Aluminum, Arc, Argon, Cold, Electromagnetic, Element, Fuel, Leakage, Material, Plastic, Pressure, Radioactivity, Sealing, Stainless, Steel, Waste, Welding.

For abstract, see STAR 05 11.
N67-23066 HC$3.00 MF$0.65

SLUDGE CONCENTRATION WITH A CENTRIFUGAL SEPARATOR.
European Atomic Energy Community, Ispra (Italy). Chemistry Dept.
R. L. Cardozo, J. Vaccarezza, and S. Vanuzzi. Dec 66, 18p EUR-3175.E

Descriptors: *Centrifuge, *Radioactive waste, *Sludge, Cost, Estimate, Hazard, Radiation, Radioactivity, Safety, Separator, Waste, Water.

For abstract, see STAR 05 11.
N67-23092 HC$3.00 MF$0.65

ETUDE DU SOLVANT PHOSPHATE TRIBUTYLIQUE 30%-DODECANE (Study of the Tributyl Phosphate - 30 % Dodecane Solvent,
Commissariat a l'Energie Atomique, Fontenay-Aux-Roses (France). Centre d'Etudes Nucleaires.
For primary bibliographic entry see Field 18J.
PB-174 565 HC$3.00 MF$0.65

ETUDE DES FACTEURS PHYSICO-CHIMIQUES INTERVENANT DANS L'EXTRACTION DE L'URANIUM ET DU PLUTONIUM PAR LE PHOSPHATE DE TRIBUTYLE EN MILIEU NITRIQUE (Study of the Physico-Chemical Agents Influencing Uranium and Plutonium Extraction by Tributylphosphate in Nitric Media),
Commissariat a l'Energie Atomique, Fontenay-Aux-Roses (France). Centre d'Etudes Nucleaires.
For primary bibliographic entry see Field 7E.
PB-174 570 HC$3.00 MF$0.65

PROCEDE CONTINU DE PRECIPITATION DES SELS DE PLUTONIUM (Continuous Precipitation Process of Plutonium Salts),
Commissariat a l'Energie Atomique, Fontenay-Aux-Roses (France). Centre d'Etudes Nucleaires.
For primary bibliographic entry see Field 7E.
PB-174 576 HC$3.00 MF$0.65

18H. RADIOACTIVITY

RADIATION EFFECTS ON THIN-FILM INTEGRATED CIRCUIT ELEMENTS.
Quarterly rept. no. 1, 15 Oct 66-14 Jan 67,
North American Aviation Inc Anaheim Calif Autonetics Div
V. H. Strahan, and A. F. Krueger. 24 Apr 67, 54p
Rept no. 6, C7-420/501
ECOM-02431-1
Contract DA-28-043-AMC-02431 (E)

Descriptors: (*Radiation effects, *Integrated circuits), Microminiaturization (Electronics), Films, Nuclear radiation, Electrodes, Capacitors, Electric currents, Dielectric properties, Vacuum, Air, Experimental data.

The efforts of this quarter were directed toward a review of the past work on this program with the objective of uncovering areas of data and information which may have been missed or not fully exploited. The general features of all previous data were reviewed. The overall wave shapes of the signals were tabulated from both the electrode and counter electrode of each capacitor studied. These tabulations were made for irradiation in air and in vacuum at Vo = +40, 0, and -40 volts. To gain further information about secondary emission replacement currents, plots of the V delta I + V delta 2 versus Vo data were prepared for as many as possible of the previously studied capacitors. These plots represent the net replacement current which occurs in the capacitor during irradiation. (Author)
AD-651 144 HC$3.00 MF$0.65

PLUTONIUM ABSTRACTS. VOLUME 6, NUMBER 11.
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
For primary bibliographic entry see Field 7D.
For abstract, see NSA 21 09.
BNWL-113-23 HC$3.00 MF$0.65

PACIFIC NORTHWEST LABORATORY ANNUAL REPORT FOR 1965 IN THE BIOLOGICAL SCIENCES.
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
For primary bibliographic entry see Field 6R.
For abstract, see NSA 21 09.
BNWL-280 HC$3.00 MF$0.65

THE GEOMETRIC FIELDS ABSOLUTELY DETERMINED BY THE BETA-GAMMA COINCIDENCE METHOD.
Der Geometrische Fehler Bei Der Absolut- Zaehlung Mit Der Beta-gamma Koinzidenzmethod
Kernforschungsanlage, Juelich (West Germany). Zentrallabor Fuer Chemische Analyse.
G. Erdtmann. Feb 65, 20p JUL-227-CA
in German

Descriptors: *Decay rate, *Position error, *Radiation measurement, *Radioactive nuclide, Analysis, Beta, Coincidence, Decay, Error, Gamma, Geometry, Liquid, Location, Measurement, Nuclide, Position, Radiation, Radioactivity, Rate, Scintillator, Spectrometry.

For abstract, see STAR 05 11.
N67-22136 HC$3.00 MF$0.65

ON NONLEPTONIC DECAYS - INTERRELATION AMONG VARIOUS TYPES OF EFFECTIVE WEAK INTERACTIONS.

Nihon Univ., Tokyo (Japan).
K. Fujii, S.-Y. Furui, M. Imoto, S. Kawasaki, and T. Tsuchida. 7 Jan 67, 52p INS-104

Descriptors: *Elementary particle, *Hadron, *Particle decay, *Two-body problem, Algebra, Baryon, Coupling, Interaction, Lepton, Matrix, Weak.

For abstract, see STAR 05 11.
N67-22475 HC$3.00 MF$0.65

THE BR2 TESTING REACTOR AND ITS CONNECTED LABORATORIES ANNUAL PROGRESS REPORT, 1965.
Centre D Etude de L Energie Nucleaire, Mol (Belgium).
For primary bibliographic entry see Field 18M.
For abstract, see STAR 05 11.
N67-22921 HC$3.00 MF$0.65

DECAY PROPERTIES OF 147 ND.
Aktiebolaget Atomenergi, Stockholm (Sweden).
A. Backlin, and S. G. Malmskog. Feb 67, 17p
AE-265

Descriptors: *Electron energy, *Energy level, *Gamma radiation, *Neodymium, *Radioactive decay, Beta, Decay, Detector, Electron, Energy, Gamma, Germanium, Intensity, Level, Lithium, Nucleus, Parity, Promethium, Radiation, Radioactivity, Spectrometer, Spectrum, Transition.

For abstract, see STAR 05 11.
N67-23396 HC$3.00 MF$0.65

DECAY OF THE 16.3 MIN 182 TA ISOMER.
Aktiebolaget Atomenergi, Studsvik (Sweden).
M. Hoejeberg, and S. G. Malmskog. Jan 67, 14p
AE-264

Descriptors: *Isomer, *Radioactive decay, *Tantalum, Coincidence, Decay, Detector, Electron, Gamma, Germanium, Ground, Half-life, Intensity, Lithium, Nucleus, Radiation, Radioactivity, Spectrometer, Transition.

For abstract, see STAR 05 11.
N67-23397 HC$3.00 MF$0.65

AVAILABLE DISINTEGRATION ENERGY OF ALL RADIONUCLIDES (FOR USE IN DOSIMETRY PROBLEMS). I. HALF-LIVES 12 HOURS OR GREATER.
California Univ., Livermore, Lawrence Radiation Lab.
For primary bibliographic entry see Field 6R.
For abstract, see NSA 21 09.
UCRL-50164 HC$3.00 MF$0.65

18I. REACTOR ENGINEERING AND OPERATION

THE POSITIVE PERIOD METHOD OF CALIBRATING CONTROL RODS OF THE AFRRI-TRIGA REACTOR USING THE AFRRI DATA ACQUISITION SYSTEM.
Armed Forces Radiobiology Research Inst Bethesda Md
Horace Schow, II. Oct 66, 29p Rept no. AFRRI-TN66-3

Descriptors: (*Research reactors, Control rods), (*Control rods, Calibration), Data processing systems, Instrumentation, Computer programs, Analog-to-digital converters, Standardization, Accuracy.
Identifiers: TRIGA reactors, Data aquisition.

Control rods of the AFRRI-TRIGA reactor are routinely calibrated by the use of the inhour relationship between the stable positive period and reactivity. The Armed Forces Radiobiology Research Institute (AFRRI) Data Acquisition System (DAS), after receiving the amplified signal from a compensated ionization chamber, samples and digitizes the input voltage each 4.2667 seconds. Both the raw data and the stable period are typed out. The design stable period is between 30 to 70 seconds and from 18 to 22 incremented steps are necessary to calibrate the central transient rod. The core of the period calculation programming is board program BPNA (Function Generator) which is listed and discussed in detail. (Author)
AD-651 000 HC$3.00 MF$0.65

FARET IN-CORE INSTRUMENT DEVELOPMENT.
Argonne National Lab., Ill.
Glenn F. Popper, and Alvin E. Knox. Jul 66, 73p
Contract W-31-109-eng-38

Descriptors: (*Thermocouples, *Flowmeters), (*Electric cables, *Electric connectors), Specifications.

For abstract, see NSA 21 09.
ANL-7161 HC$3.00 MF$0.65

AN EVALUATION OF THE APPLICABILITY OF EXISTING DATA TO THE ANALYTICAL DESCRIPTION OF A NUCLEAR-REACTOR ACCIDENT.
Quarterly progress rept., Oct.-Dec. 66,
Battelle Memorial Inst., Columbus, Ohio.
David L. Morrison, Joseph M. Genco, James A.Gieseke, and Roger O. Wooton. 1 Jan 67, 57p
Contract W-7405-eng-92

Descriptors: (*Reactor accidents, Nuclear reactions), (*Reactor operation, *Reactor coolants), Heat transfer, Thermodynamics.

For abstract, see NSA 21 09.
BMI-1790 HC$3.00 MF$0.65

INVESTIGATION OF THE INITIATION AND EXTENT OF DUCTILE PIPE RUPTURE.
Progress rept., May-Dec 66,
Battelle Memorial Inst., Columbus, Ohio.
Robert J. Eiber, Glen M. Hein, and Arthur R. Duffy. 1 Jan 67, 26p
Contract W-7405-eng-92

Descriptors: (*Pipes, Rupture), (*Ductility, Pipes), Failure (Mechanics), Reactor coolants, Fracture (Mechanics).

For abstract, see NSA 21 09.
BMI-1793 HC$3.00 MF$0.65

FABRICATION COSTS FOR PLUTONIUM FUEL ELEMENTS. PART E. THE VARIATION IN FABRICATION COST WITH SOME FUEL DESIGN PARAMETERS.
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
C. H. Bloomster. Feb 67, 22p
Contract AT (45-1)-1830

Descriptors: (*Reactor fuel elements, Plutonium), Costs, Test reactors, Reactor fuel rods.

For abstract, see NSA 21 09.
BNWL-131E HC$3.00 MF$0.65

EFFECTIVE TWO-GROUP GAMMA-RAY SPECTRA FOR THERMAL NEUTRON CAPTURE AND PROMPT FISSION.
Los Alamos Scientific Lab., N. Mex.
For primary bibliographic entry see Field 18F.
For abstract, see NSA 21 09.
LA-3619 HC$3.00 MF$0.65

THE INTERACTION BETWEEN CONTROL RODS AS ESTIMATED BY SECOND-ORDER ONE-GROUP PERTURBATION THEORY.
Aktiebolaget Atomenergi, Stockholm (Sweden).
R. Persson. Oct 66, 44p AE-250

Descriptors: *Approximation method, *Control rod, *Perturbation theory, *Reactor material, Approximation, Buckling, Calculation, Control, Core, Diffusion, Interaction, Material, Method, Order, Perturbation, Reactivity, Reactor, Rod, Second, Theory.

For abstract, see STAR 05 11.
N67-22904 HC$3.00 MF$0.65

THERMIONIC.
Thermionik
Kernforschungsanlage, Juelich (West Germany).
D. Wickmann. Aug 63, 23p JUL-BIBL-1
in German

Descriptors: *Bibliography, *Fuel element, *Reactor fuel, *Thermionic conversion system, Canning, Cell, Cesium, Cladding, Conversion, Diode, Electrode, Electron, Element, Emission, Fuel, Gas, High temperature, Material, Plasma, Reactor, System, Thermionic, Triode, Vacuum.

For abstract, see STAR 05 11.
N67-22922 HC$3.00 MF$0.65

ENERGY TRANSFER USING THE MOSEL REACTOR.
Energieuebertragung Beim Mosel-reaktor
Kernforschungsanlage, Juelich (West Germany). Institut Fuer Reaktorentwicklung.
H. Heinrichs. Nov 66, 43p JUL-422-RG
in German

Descriptors: *Cooling system, *Energy transfer, *Molten-salt reactor (msre), *Thermodynamic efficiency, Calculation, Cooling, Efficiency, Energy, Evaluation, Exchanger, Generator, Heat transfer, Lead, Molten, Pipe, Reactor, Salt, Sodium, Steam, System, Thermodynamic, Transfer, Water.

For abstract, see STAR 05 11.
N67-22928 HC$3.00 MF$0.65

COSTANZA - CYLINDRICAL. A CYLINDRICAL ONE- DIMENSIONAL DYNAMICS CODE FOR LIQUID-COOLED MULTI-CHANNEL NUCLEAR REACTORS.
European Atomic Energy Community, Ispra (Italy).
A. Agazzi, G. Forti, and E. Vincenti. Nov 66, 67p
EUR-3171.E

Descriptors: *Computer program, *Dynamic model, *Liquid cooled reactor, *Reactor technology, Cladding, Code, Computer, Control, Cooling, Dynamic, Fortran, Fuel, Heat transfer, Liquid, Model, Multichannel, Program, Radial, Reactor, Technology, Temperature, Zone.

For abstract, see STAR 05 11.
N67-22930 HC$3.00 MF$0.65

RESEARCH PROGRAM FOR HYDRODYNAMIC AND THERMODYNAMIC INVESTIGATIONS IN SINGLE AND TWO-PHASE FLOW.
Oesterreichische Studiengesellschaft Fuer Atomenergie G.M.B.H., Seibersdorf.
H. Schmidl. 1966, 44p SGAE-RE-7/1966
Presented At the Comm. Meeting on Reactor Safety Technol., Paris, 2-4 Nov. 1966

Descriptors: *Boiling water reactor, *Reactor physics, *Single-phase flow, *Two-phase flow, Boil-

ing, Data, Exchanger, Facility, Flow, Handling, Heat, Heat transfer, Hydrodynamics, Instrumentation, Operation, Phase, Physics, Plant, Reactor, Safety, Single, Stability, Thermodynamics, Two, Water.

For abstract, see STAR 05 11.
N67-22977 HC$3.00 MF$0.65

PULSED REACTOR - REFERENCES.
Gepulste Reaktoren - Literaturhinweise
Kernforschungsanlage, Jueli (West Germany). Zentralinstitut Fuer Reaktorexperimente.
F. Krueger. Jul 64, 18p JUL-BIBL-9
in German

Descriptors: *Nuclear fuel, *Pulsed radiation, *Reactor technology, Development, Dosimetry, Fuel, Hazard, Literature, Neutron, Nuclear, Output, Program, Pulse, Radiation, Reactor, Review, Safety, Survey, Technology.

For abstract, see STAR 05 11.
N67-23028 HC$3.00 MF$0.65

COMPILATION OF UNITED STATES NUCLEAR STANDARDS, 3RD EDITION, 1966.
Oak Ridge National Lab., Tenn.
For primary bibliographic entry see Field 6R.
For abstract, see NSA 21 09.
ORNL-NSIC-30 HC$3.00 MF$0.65

EXPERIENCES DE PULSATIONS NEUTRONIQUES SUR LE REACTEUR A GRAPHITE KDF 3 (Pulsed Neutron Experiments on the Graphite Power Reactor EDF 3),
Commissariat a l'Energie Atomique, Saclay (France). Centre d'Etudes Nucleaires.
For primary bibliographic entry see Field 18L.
PB-174 562 HC$3.00 MF$0.65

GUIDE DE CRITICITE. I. INTRODUCTION A LA CRITICITE. II. REGLES PRATIQUES (Criticality Guide. I. Introduction to Criticality. II. Practical Rules).
Commissariat a l'Energie Atomique, Saclay (France). Centre d'Etudes Nucleaires.
For primary bibliographic entry see Field 18K.
PB-174 573 HC$3.00 MF$0.65

ETUDE EXPERIMENTALE DE PLAQUES MINCES CARREES ET ENCASTREES SUR LEURS QUATRE RIVES (PLAFONDS DE CAISSONS ETANCHES) (Experimental Study of Thin Square Slabs, Embedded on all Four Sides (Pressure Vessel Floors)),
Commissariat a l'Energie Atomique, Fontenay-Aux-Roses (France). Centre d'Etudes Nucleaires.
Andre Valentin. Mar 67, 61p CEA-R-3184
Text in French; attached summary in English.

Descriptors: (*Pressure vessels, *Foundations (Structures)), (*Reactor system components, Foundations (Structures)), (*Floors, Mechanical properties), Metal plates, Stainless steel, Deformation, Equations, Supports, France.

The study was designed to test experimentally the mechanical strength of large thin plates made of non-magnetic stainless steel and subjected to transverse forces; these plates are intended to be used as the flooring of pressure vessels. The plates were mounted on frames, each pillar of which had been previously pre-stressed at its centre point, with a force of 300 kg, 600 kg, and 800 kg. The experiments showed that the amounts of flexation at the centre w were related to the loads q by equations of the type: q (a to the 4th) Db= (w/m) (A+B (w/h)sq.), where 2a, h and D represent respectively the length of a side, the thickness and the rigidity under flexation of the plates held on the four sides. The coefficients A and B were determined for different cases; the equations obtained are discussed. It is shown in particular that pre-stressing of the pillars is beneficial but that the movement of the plates at their edges cannot be considered to be non-existent with the set-ups used. (Author)
PB-174 577 HC$3.00 MF$0.65

18J. REACTOR MATERIALS .

VANADIUM ALLOY SCREENING STUDIES AND FABRICATION OF V-15 ST. PERCENT TI-7.5 WT. PERCENT CR TUBING FOR NUCLEAR FUEL CLADDING,
Argonne National Lab., Ill.
For primary bibliographic entry see Field 11F.
For abstract, see NSA 21 09.
ANL-7206 HC$3.00 MF$0.65

FABRICATION COSTS FOR PLUTONIUM FUEL ELEMENTS, PART E. THE VARIATION IN FABRICATION COST WITH SOME FUEL DESIGN PARAMETERS,
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
For primary bibliographic entry see Field 18I.
For abstract, see NSA 21 09.
BNWL-131E HC$3.00 MF$0.65

DEMONSTRATION OF THE SALT CYCLE PROCESS IN A HIGH-LEVEL RADIOCHEMICAL FACILITY,
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
For primary bibliographic entry see Field 7E.
For abstract, see NSA 21 09.
BNWL-355 HC$3.00 MF$0.65

EFFECTIVE TWO-GROUP GAMMA-RAY SPECTRA FOR THERMAL NEUTRON CAPTURE AND PROMPT FISSION,
Los Alamos Scientific Lab., N. Mex.
For primary bibliographic entry see Field 18F.
For abstract, see NSA 21 09.
LA-3619 HC$3.00 MF$0.65

WEAR RATES OF METALS AND OXIDES IN 80 DEG AND 160 DEG F HIGH PURITY WATER.
Atomic Energy of Canada, Ltd., Chalk River (Ontario). Nuclear Lab.
J. T. Dunn. Aug 67, 79p AECL-2602

Descriptors: *Carbide, *Ceramics, *Metal, *Oxide, *Water, *Wear, Alloy, Copper, High purity, Nickel, Reactor, Silver, Stainless, Steel, Technology, Zirconium.

For abstract, see STAR 05 11.
N67-22476 HC$3.00 MF$0.65

ACCELERATED EROSION TESTING OF CANDIDATE SNAP-8 TURBINE ROTOR AND NOZZLE MATERIALS.
Aerojet-general Corp., Azusa, Calif.
H. E. Bleil. 5 Feb 64, 9p NASA-CR-72199, TM-390-64-4-207

Descriptors: *Closed loop system, *Materials erosion, *Mercury vapor, *Snap- 8, *Turbine blade, Alloy, Auxiliary, Base, Blade, Closed, Cobalt, Erosion, Loop, Material, Nozzle, Nuclear, Power, Pump, Rotor, System, Turbine.

For abstract, see STAR 05 11.
N67-22855 HC$3.00 MF$0.65

ESTIMATING THERMAL CONDUCTIVITY OF CERMET FUEL MATERIALS FOR NUCLEAR REACTOR APPLICATION.
National Aeronautics and Space Administration, Lewis Research Center, Cleveland, Ohio.
J. V. Miller. Apr 67, 30p NASA-TN-D-3898
Contract I 22-20-02-04-22

Descriptors: *Cermet, *Mathematical model, *Nuclear fuel, *Reactor fuel, *Thermoconductivity, Anisotropy, Coating, Conductivity, Data, Element, Estimation, Fuel, Mathematics, Model, Nuclear, Operation, Reactor, Temperature, Thermal.

For abstract, see STAR 05 11.
N67-22866 HC$3.00 MF$0.65

EVALUATION OF METHODS TO REMOVE DECOMPOSED MIX-4 P3 E FROM 9 CR-1 MO STEEL.
Aerojet-general Corp., Azusa, Calif.
For primary bibliographic entry see Field 18N.
For abstract, see STAR 05 11.
N67-22880 HC$3.00 MF$0.65

CORROSION OF STAINLESS STEELS IN HIGH TEMPERATURE WATER AND STEAM.
Societe D Etudes, de Recherches Et D Applications pour L Industrie, Brussels (Belgium).
For primary bibliographic entry see Field 11F.
For abstract, see STAR 05 11.
N67-22906 HC$3.00 MF$0.65

THERMIONIC.
Kernforschungsanlage, Juelich (West Germany).
For primary bibliographic entry see Field 18I.
For abstract, see STAR 05 11.
N67-22922 HC$3.00 MF$0.65

PROBLEMS OF A SODIUM-LOOP DESIGNED TO OPERATE AT TEMPERATURES UP TO 900 DEG C.
Oesterreichische Studiengesellschaft Fuer Atomenergie G.M.B.H., Seibersdorf. Inst. Fuer Reaktorentwicklung.
E. Matyas, G. Rajakovics, and N. Schwarz. 1966, 17p SGAE-RE-61966
Presented At the Symp. on Alkali-metal Coolants Corrosion Studies and Systems Operating Experience, Vienna, 28 Nov. 1966 Prepared in Cooperation With Gebrueder Boehler and Co.

Descriptors: *Corrosion resistance, *Loop, *Metal corrosion, *Sodium, Alloy, Corrosion, Exchanger, Heat, Heat transfer, High temperature, Metal, Research, Resistance, Steel.

For abstract, see STAR 05 11.
N67-22979 HC$3.00 MF$0.65

PHYSICAL PROPERTIES OF FLUORIDE MOLTEN SALTS, WITH SPECIAL APPLICATION TO THE MOSEL REACTOR CONCEPT.
Physikalische Stoffwerte Von Fluoridsalz-Schmelzen, Spezielle Anwendung Auf Das Moselreaktorkonzept
Kernforschungsanlage, Juelich (West Germany). Inst. Fuer Reaktorentwicklung.
H. W. Vornhusen. May 65, 37p JUL-268-RG
in German

Descriptors: *Cooling system, *Fluoride, *Molten-salt reactor (msre), *Nuclear fuel, Boiling, Combination, Conductivity, Cooling, Density, Element, Fuel, Heat, Molten, Nuclear, Physics, Point, Property, Reactor, Salt, System, Technology, Viscosity.

For abstract, see STAR 05 11.
N67-23030 HC$3.00 MF$0.65

A PHYSICO-CHEMICAL ANALYTIC METHOD FOR THE TESTING OF REACTOR MATERIALS AND NUCLEAR FUEL.
Physikalisch-chemische Analysenmethoden Zur Untersuchung Von Reaktormaterialien Und Kernbrennstoffen
Kernforschungsanlage, Juelich (West Germany).

Inst. Fuer Reaktorwerkestoffe.
H. Nickel. Jan 65, 144p JUL-216-RW
in German

Descriptors: *Nuclear fuel, *Physical chemistry, *Reactor material, Activation, Analysis, Chemistry, Diffraction, Element, Extraction, Fluorescence, Fuel, Material, Method, Microscopy, Neutron, Nuclear, Oxygen, Physical, Reactor, Structure, Technology, X-ray.

For abstract, see STAR 05 11.
N67-23031 HC$3.00 MF$0.65

DISASSEMBLY AND SAMPLING OF GRAPHITE BALL FUEL ELEMENTS.
Kernforschungsanlage, Juelich (West Germany). Laboratorium Fuer Radioaktive Festkoerper.
H. Erfurth, F. Stockschlaeder, and M. Ullrich.
Apr 65, 17p JUL-25-RW
Its Paper No. 53

Descriptors: *Fuel element, *Graphite, *Machine tool, *Sampling device, *Spherical shell, Ball, Device, Element, Examination, Fuel, Lathe, Machine, Postirradiation, Sampling, Shell, Spherical, Splitting, Tool.

For abstract, see STAR 05 11.
N67-23065 HC$3.00 MF$0.65

THERMOCOUPLE COMPOSITION CHANGES DUE TO NEUTRON IRRADIATION.
European Atomic Energy Community, Brussels (Belgium).
H. Ehringer, C. Moogini-tamagnini, and C. Ponti.
Oct 66, 43p EUR-3156.E

Descriptors: *Neutron bombardment, *Platinum alloy, *Reactor technology, *Thermocouple, Alloy, Bombardment, Fortran, Iron, Material, Molybdenum, Neutron, Nickel, Palladium, Platinum, Reactor, Rhodium, Ruthenium, Technology, Testing.

For abstract, see STAR 05 11.
N67-23093 HC$3.00 MF$0.65

LABORATORY DEVELOPMENT OF THE GRIND-LEACH PROCESS FOR THE H.T.G.C.R. FUEL CYCLE. PART 2. DISSOLUTION OF BERYLLIA IN NITRIC ACID SOLUTIONS.
Atomic Energy Commission Research Establishment, Lucas Heights (Australia).
For primary bibliographic entry see Field 7A.
For abstract, see STAR 05 11.
N67-23206 HC$3.00 MF$0.65

COMPILATION OF UNITED STATES NUCLEAR STANDARDS. 3RD EDITION, 1966.
Oak Ridge National Lab., Tenn.
For primary bibliographic entry see Field 6R.
For abstract, see NSA 21 09.
ORNL-NSIC-30 HC$3.00 MF$0.65

ETUDE DU SOLVANT PHOSPHATE TRIBUTYLIQUE 30%-DODECANE (Study of the Tributyl Phosphate - 30 % Dodecane Solvent,
Commissariat a l'Energie Atomique, Fontenay-Aux-Roses (France). Centre d'Etudes Nucleaires.
Paul Leroy. Mar 67, 154p CEA-R-3207
Text in French; attached summary in English.

Descriptors: (*Solvent extraction, *Reactor fuel processing), (*Organic phosphorus compounds, Solvent extraction), Phosphates, Hydrocarbons, Solvents, Phase studies, Water, Nitric acid, Chemical properties, France.
Identifiers: Dodecanes, Tributyl phosphates.

The study, originating mainly from a literature survey, gives the principal chemical and physical features of the tributyl-phosphate (TBP) agent diluted at 30 volume per cent in dodecane. The mixture is a very commonly used extractant in nuclear fuel processing. The main following points are reported: the components (TBP and diluents); TBP - diluents systems (non loaded); TBP - diluents - water systems; TBP - diluent - water - nitric acid systems; Industrial solvent. (Author)
PB-174 565 HC$3.00 MF$0.65

ETUDE DES REACTIONS ClF3-UO2F2 ET ClO2F-UO2F2 (Study of the Reactions ClF3-UO2F2 and ClO2F-UO2F2),
Commissariat a l'Energie Atomique, Saclay (France). Centre d'Etudes Nucleaires.
For primary bibliographic entry see Field 7B.
PB-174 568 HC$3.00 MF$0.65

ETUDES DE COMPOSES U-Pu-C-Ti (Studies of U-Pu-C-Ti Compounds),
Commissariat a l'Energie Atomique, Fontenay-Aux-Roses (France). Centre d'Etudes Nucleaires.
Claude Milet. Mar 67, 46p CEA-R-3201
Text in French; attached summary in English.

Descriptors: (*Reactor fuels, Phase studies), (*Uranium compounds, Phase studies), (*Plutonium compounds, Phase studies), (*Titanium compounds, Phase studies), (*Carbides, Reactor fuels), Solid solutions, Refractory materials, Reactor fuel rods, Eutectics, Corrosion, Compatibility, Thermal conductivity, Resistance (Electrical).
Identifiers: Plutonium carbides, Titanium carbides, Uranium carbides.

The U-Pu-C-Ti compounds (5 to 20 at per cent Ti) were studied in order to improve some properties of U-Pu-C carbides and to extend the existence field of the (U, Pu) C phase. The Pu/U + Pu ratio was fixed to 15 per cent. All the alloys were elaborated and casted in an arc furnace. A two-phase field (U, Pu)C + Ti C exists which permits to avoid di- and sesquicarbides and the (U, Pu) phase. An eutectic between (U, Pu)C and Ti C was found around 15 at per cent Ti. Practically the whole of the titanium is in TiC form, titanium solubility in (U, Pu)C being inferior to 1 at per cent. The most promissing alloys are those containing two phases: (U, Pu)C+ TiC. In comparison with the (U, Pu)C phase, titanium addition does not change very much the thermal expansion coefficients nor the thermal cycling behaviour between 160 and 1000C which is excellent. On the other hand atmospheric corrosion behaviour is improved; compatibility with stainless steel is better; thermal conductivity, calculated from electrical resistivity is enhanced. (Author)
PB-174 569 HC$3.00 MF$0.65

ETUDE DES FACTEURS PHYSICO-CHIMIQUES INTERVENANT DANS L'EXTRACTION DE L'URANIUM ET DU PLUTONIUM PAR LE PHOSPHATE DE TRIBUTYLE EN MILIEU NITRIQUE (Study of the Physico-Chemical Agents Influencing Uranium and Plutonium Extraction by Tributyl-phosphate in Nitric Media),
Commissariat a l'Energie Atomique, Fontenay-Aux-Roses (France). Centre d'Etudes Nucleaires.
For primary bibliographic entry see Field 7E.
PB-174 570 HC$3.00 MF$0.65

PROCEDE CONTINU DE PRECIPITATION DES SELS DE PLUTONIUM (Continuous Precipitation Process of Plutonium Salts),
Commissariat a l'Energie Atomique, Fontenay-Aux-Roses (France). Centre d'Etudes Nucleaires.
For primary bibliographic entry see Field 7E.
PB-174 576 HC$3.00 MF$0.65

18K. REACTOR PHYSICS

PILE NEUTRON CAPTURE CROSS SECTIONS OF RARE EARTH ISOTOPES.
Oesterreichische Studiengesellschaft Fuer Atomenergie G.M.B.H., Seibersdorf.
R. Dobrozemsky, E. Formann, G. Lugmair, F. Pichlmayer, and F. P. Viehboeck. 1966, 14p
SGAE-PH-47/1966
Submitted for Publication

Descriptors: *Mass spectrometry, *Neutron cross section, *Rare earth, *Table, Capture, Composition, Cross section, Earth, Gadolinium, Isotope, Mass, Neutron, Pile, Radiation, Rare, Spectrometry, Ytterbium.

For abstract, see STAR 05 11.
N67-22978 HC$3.00 MF$0.65

MESURE DE FLUX DE NEUTRONS EN RALENTISSEMENT AU MOYEN DE DETECTEURS EN SANDWICHES Au-La-Co-Mn (Measurement of Moderated Neutron Fluxes using Au-La-Co-Mn Sandwich Detectors),
Commissariat a l'Energie Atomique, Fontenay-Aux-Roses (France). Centre d'Etudes Nucleaires.
For primary bibliographic entry see Field 18D.
PB-174 567 HC$3.00 MF$0.65

MESURE ABSOLUE D'UN FLUX ETALON DE NEUTRONS THERMIQUES PAR ACTIVATION DE DETECTEURS D'OR (Absolute Measurement of a Standard Thermal-Neutron Flux using Gold-Detector Activation),
Commissariat a l'Energie Atomique, Fontenay-Aux-Roses (France). Centre d'Etudes Nucleaires.
For primary bibliographic entry see Field 18D.
PB-174 572 HC$3.00 MF$0.65

GUIDE DE CRITICITE. I. INTRODUCTION A LA CRITICITE. II. REGLES PRATIQUES (Criticality Guide. I. Introduction to Criticality. II. Practical Rules).
Commissariat a l'Energie Atomique, Saclay (France). Centre d'Etudes Nucleaires.
Feb 67, 76p CEA-R-3114
Text in French, attached summary in English.

Descriptors: (*Critical assemblies, Handbooks), Neutron reactions, Equations, Reactor safety systems, Reactor kinetics, Plutonium, Uranium, Reactor power density, France.

Some elements of neutronics are presented in a simple and often intuitive way; the K infinite and K effective formulae are derived and discussed. The limiting solid angle method is explained and some simple formulae proposed for evaluating the interaction between fissile units. The general principes used in studying the safety of nuclear installations using fissile matter are given. Practical rules, critical mass and critical geometry curces as well as all the numerical values required for normal criticality calculations are given for plutonium and uranium at various degrees of enrichment. This guide is not intended to produce experts in criticality and cannot replace the advice which can be given by specialists of a science which is still expanding rapidly. It should however simplify the task of these specialists by familiarising with these problems both the engineers and scientists in charge of the design of installations using fissile matter, and the persons in charge of their operation. (Author)
PB-174 573 HC$3.00 MF$0.65

18L. REACTORS (POWER)

AN EVALUATION OF THORIUM FUEL CIRCULATION.
Eine Bewertung Von Thorium-brennstoffkreis-Laeufen
Kernforschungsanlage, Juelich (West Germany). Inst. Fuer Reaktorentwicklung.
P. R. Kasten. Jun 65, 169p JUL-276-RG
in German

Descriptors: *Closed cycle, *Fast reactor, *Nuclear fuel, *Thorium, Breeding, Closed, Conversion, Cooling, Cycle, Evaluation, Fast, Fuel, Molten, Nuclear, Rate, Reactor, Recycle, Salt, Shift, Spectrum, System.

For abstract, see STAR 05 11.
N67-23032 HC$3.00 MF$0.65

REACTOR PRESSURE VESSELS MADE OUT OF PRESTRESSED CONCRETE - SHORT OUTLINE OF DEVELOPMENT TO DATE.
Reaktordruckgefaesse Aus Spannbeton - Kurzer Abriss des Heutigen Entwicklungs- Standes
Kernforschungsanlage, Juelich (West Germany). Projektabteilung.
H. Luks. Jul 66, 41p JUL-350-VW
in German

Descriptors: *Concrete, *Power reactor, *Pressure vessel, *Reactor material, Bibliography, Cooling, Geometry, Insulation, Lining, Material, Model, Power, Pressure, Prestressing, Reactor, Steel, Test, Vessel.

For abstract, see STAR 05 11.
N67-23097 HC$3.00 MF$0.65

EXPERIENCES DE PULSATIONS NEUTRONIQUES SUR LE REACTEUR A GRAPHITE KDF 3 (Pulsed Neutron Experimenis on the Graphite Power Reactor EDF 3),
Commissariat a l'Energie Atomique, Saclay (France). Centre d'Etudes Nucleaires.
Serge Fuster, Andre Tarabella, and Henry Tellier. Apr 67, 37p CEA-R-3162
Text in French; Attached summary in English.

Descriptors: (*Power reactors, *Neutron reactions), (*Graphite moderated reactors, Control rods), (*Control rods, Calibration), Gas-cooled reactors, Neutron flux, Reactor fuel elements, Radiation measurement systems, Test methods, France.
Identifiers: Chinon reactors (EDF-3).

The use of the pulsed neutron technique on the EDF 3 reactor made it possible to calibrate a rather large number of control elements. This technique, which was tested on EDF 2, has given good results, of which the interpretation is difficult due to the reactor size. As some processes (geometrical location of sources and counters) were currently used to avoid this kind of difficulties, another method for interpreting the results is proposed. The measurements are in good agreement with other experimental results obtained with the air-poisoning techniques, and generally confirm the data obtained by preliminary computations. The experimental material was satisfying and seems particularly adapted to the problems to be solved. (Author)
PB-174 562 HC$3.00 MF$0.65

18M. REACTORS (NON-POWER)

FARET IN-CORE INSTRUMENT DEVELOPMENT,
Argonne National Lab., Ill.
For primary bibliographic entry see Field 18I.
For abstract, see NSA 21 09.
ANL-7161 HC$3.00 MF$0.65

THE BR2 TESTING REACTOR AND ITS CONNECTED LABORATORIES ANNUAL PROGRESS REPORT, 1965.
Centre D Etude de L Energie Nucleaire, Mol (Belgium).
1966, 39p EUR-3138.E
Contract EURATOM-006-60-5 BRAB

Descriptors: *Europe, *Radiation measurement, *Reactor technology, *Test reactor, Belgium, Capsule, Development, Device, Equipment, Instrumentation, Irradiation, Isotope, Loop, Measurement, Neutron, Nuclear, Operation, Physics, Radiation, Reactor, Technology, Test.

For abstract, see STAR 05 11.
N67-22921 HC$3.00 MF$0.65

18N. SNAP TECHNOLOGY

SNAP-8 THIRD LOOP OPTIMIZATION.
Aerojet-general Corp., Azusa, Calif.
F. R. Cleveland, E. F. Perez, and L. Rico. 22 Apr 63, 66p NASA-CR-72213, TM-345-63-1-106

Descriptors: *Closed loop system, *Eutectic alloy, *Potassium, *Snap- 8, *Sodium cooling, Alloy, Closed, Condenser, Cooling, Design, Eutectic, Exchanger, Fin, Fluid, Heat, Loop, Operation, Optimum, Parameter, Radiator, Sodium, System, Tube.

For abstract, see STAR 05 11.
N67-22845 HC$3.00 MF$0.65

CYLINDRICAL RADIATOR ANALYSIS WITH INTERIOR INSULATED.
Aerojet-general Corp., Azusa, Calif.
J. Edberg, and E. F. Perez. 22 Apr 63, 9p NASA-CR-72210, TM-345-63-1-108

Descriptors: *Heat rejection device, *Insulated structure, *Radiator, *Snap- 8, Cylinder, Design, Device, Evaluation, Flat, Heat, Insulation, Optimum, Rejection, Size, Structure, Weight.

For abstract, see STAR 05 11.
N67-22849 HC$3.00 MF$0.65

WEIGHT-AREA TRADE-OFF STUDY FOR A FLAT SNAP-8 RADIATOR.
Aerojet-general Corp., Azusa, Calif.
D. L. Forrest, and E. F. Perez. 22 Apr 63, 10p NASA-CR-72209, TM-345-63-1-103

Descriptors: *Heat rejection device, *Radiator, *Snap- 8, *Weight analysis, Analysis, Area, Curve, Design, Device, Flat, Heat, Optimum, Rejection, Tradeoff, Weight.

For abstract, see STAR 05 11.
N67-22850 HC$3.00 MF$0.65

RELIABILITIES OF REDUNDANT ELECTRICAL GENERATOR SYSTEMS.
Aerojet-general Corp., Azusa, Calif.
B. L. Amstadter. 9 Mar 64, 14p NASA-CR-72208, TM-343-64-3-215

Descriptors: *Electric energy, *Power generator, *Redundant structure, *Reliability, *Snap- 2, Auxiliary, Calculation, Comparison, Configuration, Electric, Energy, Generator, Nuclear, Power, Redundancy, Snap- 8, Structure, System, Table.

For abstract, see STAR 05 11.
N67-22854 HC$3.00 MF$0.65

ACCELERATED EROSION TESTING OF CANDIDATE SNAP-8 TURBINE ROTOR AND NOZZLE MATERIALS.
Aerojet-general Corp., Azusa, Calif.
For primary bibliographic entry see Field 18J.
For abstract, see STAR 05 11.
N67-22855 HC$3.00 MF$0.65

ALUMINUM-TO-COPPER COLDWELDED JOINTS FOR SNAP-8 ELECTRICAL TERMINAL APPLICATIONS.
Aerojet-general Corp., Azusa, Calif.
For primary bibliographic entry see Field 11F.
For abstract, see STAR 05 11.
N67-22856 HC$3.00 MF$0.65

CYLINDRICAL RADIATOR WITH INTERNAL HEAT REJECTION.
Aerojet-general Corp., Azusa, Calif.
E. F. Perez. 22 Apr 63, 15p NASA-CR-72211, TM-345-63-1-105

Descriptors: *Approximation method, *Heat rejection device, *Radiator, *Snap- 8, Analysis, Approximation, Cylinder, Design, Device, End, External, Heat, Internal, Method, Rejection, Size, Temperature, Weight.

For abstract, see STAR 05 11.
N67-22857 HC$3.00 MF$0.65

A STUDY OF CONDENSER INVENTORY CONTROL FOR THE SNAP-8 SYSTEM.
Aerojet-general Corp., Azusa, Calif.
I. P. Wishney. 1 May 64, 26p NASA-CR-72216, TM-340-64-1-228

Descriptors: *Condensation pump, *Control system, *Inventory control, *Mercury vapor, *Snap- 8, Computer, Condensation, Control, Equation, Inventory, Mercury, Pressure, Pump, Regulation, Simulation, System, Vapor.

For abstract, see STAR 05 11.
N67-22858 HC$3.00 MF$0.65

EVALUATION OF METHODS TO REMOVE DECOMPOSED MIX-4 P3 E FROM 9 CR-1 MO STEEL.
Aerojet-general Corp., Azusa, Calif.
F. H. Cassidy. 2 Aug 65, 10p NASA-CR-72223, TM-4923-65-4-310

Descriptors: *Chromium steel, *Coolant, *Lubricant, *Molybdenum alloy, *Thermal decomposition, Alloy, Chromium, Decomposition, Molybdenum, Oxidation, Pickling, Precipitation, Removal, Snap- 8, Steel, Thermal.

For abstract, see STAR 05 11.
N67-22880 HC$3.00 MF$0.65

MATERIALS EVALUATION OF TRANSITION JOINTS FOR TRANSFORMER REACTOR ASSEMBLY.
Aerojet-general Corp., Azusa, Calif.
F. H. Cassidy. 11 May 65, 20p NASA-CR-72195, TM-4923-65-4-301

Descriptors: *Joint, *Material testing, *Metal coating, *Snap- 8, Aluminum, Assembly, Coating, Copper, Heat, Material, Metal, Reactor, Sink, Stainless, Steel, Testing, Transformer, Transition.

For abstract, see STAR 05 11.
N67-22894 HC$3.00 MF$0.65

19. ORDNANCE

19A. AMMUNITION, EXPLOSIVES, AND PYROTECHNICS

HYDRAZOIC ACID AND THE METAL AZIDES (A LITERATURE SURVEY),
Army Engineer Research and Development Labs., Fort Belvoir, Va.
For primary bibliographic entry see Field 7B.
AD-268 586 HC$3.00

A LOW-FREQUENCY THERMAL FOLLOW BRIDGE FOR MEASURING THE ELECTRO-THERMAL PARAMETERS OF BRIDGEWIRES,

Naval Ordnance Lab White Oak Md Explosion Dynamics Div
James N. Ayres, Louis A. Rosenthal, and Richard A. Maio. 17 Mar 67, 34p
NOLTR-66-113

Descriptors: (*Exploding wires, *Non-destructive testing), (*Electric bridges, Non-destructive testing), Phase shift, Explosives initiators.

Advances were made in the art of measuring, non-destructively, the electro-thermal parameters of wire bridge electro-explosive devices. In particular, the thermal-follow phase-shift bridge was redesigned to operate at lower frequencies (approximately 10 Hertz instead of the previous 60 Hertz). Fourfold increases in resolution and accuracy are typical of the lower frequency. Two circuits are described one being battery powered and the other powered from AC mains. Experimental data obtained on one of these circuits are included to show how clearly these measurements detect the presence of explosive in contact with the bridgewire. (Author)
AD-650 963 HC$3.00 MF$0.65

THE KINETICS OF THE THERMAL DECOMPOSITION OF MOLTEN SILVER AZIDE.
Research rept.,
Army Engineer Research and Development Labs Fort Belvoir Va
Herbert J. Mueller. Mar 67, 20p Rept no. AERDL-1893

Descriptors: (*Explosives initiators, Pyrolysis), (*Silver compounds, Pyrolysis), (*Azides, Pyrolysis), Decomposition, Heat of activation, Reaction kinetics, Chemical reactions, Nucleation.
Identifiers: Silver azide.

The report covers an investigation of the thermolysis of molten silver azide (AgN3), which process is considered to be fundamental for the ignition of the explosive by thermal stimulus. The isothermal decomposition of molten silver azide was investigated in the temperature interval 309-340C. Decomposition was found to occur at the metal-azide interface with an activation energy of 38 plus or minus 2.5 kcal/mole. Initially, the decomposition proceeds at a constant rate. After a while, the reaction becomes accelerated as a result of the formation of silver nuclei in the melt. The rate of reaction is then proportional to the third power of time, and an apparent energy of activation of 138 plus or minus 5 kcal/mole is measured. The activation energy for the growth of silver nuclei in the melt is estimated to be ca. 24 kcal/mole. The latter value can be interpreted as the activation energy for the migration of interstitial silver in the azide matrix. (Author)
AD-651 062 HC$3.00 MF$0.65

THE USE OF CATALYTIC SURFACTANTS IN PLASTIC PROPELLANTS.
Explosives Research and Development Establishment, Waltham Abbey (England).
B. C. Howard, and J. Powling. Dec 65, 19p
ERDE-15/M/65, NAC/168/014

Descriptors: *Burning rate, *Catalyst, *Plastic propellant, *Solid propellant, *Surfactant, Acid, Aerosol, Ammonium, Burn, Chromate, Copper, Kinetics, Metal, Oxidizer, Perchlorate, Plastic, Propellant, Rate, Reaction, Solid.

For abstract, see STAR 05 11.
N67-22785 HC$3.00 MF$0.65

19C. COMBAT VEHICLES

REPORT ON PRELIMINARY OBSERVATIONS OF HUMAN ENGINEERING PROBLEMS UNDER ARCTIC CONDITIONS 1952-53,
Human Engineering Labs., Aberdeen Proving Ground, Md.
For primary bibliographic entry see Field 5H.
AD-12 497 HC$3.00

19D. EXPLOSIONS, BALLISTICS, AND ARMOR

ATTENUATION OF PEAKED AIR SHOCK WAVES IN SMOOTH TUNNELS.
Ballistic Research Labs Aberdeen Proving Ground Md
For primary bibliographic entry see Field 13M.
AD-650 741 HC$3.00 MF$0.65

EVALUATION OF NEW SELF-RECORDING AIR BLAST INSTRUMENTATION: PROJECT 1.3b OPERATION SNOW BALL.
Memorandum rept.,
Ballistic Research Labs Aberdeen Proving Ground Md
Daniel P. LeFevre. Jan 67, 97p Rept no. BRL-MR-1815

Descriptors: (*Airburst, *Recording systems), (*Pressure gages, Acceptability), (*Accelerometers, Acceptability), Instrumentation, Sensors, Shock waves, Measurement, Calibration.
Identifiers: Snowball operation.

The report presents a description and evaluation of experimental self-recording pressure-time gages and triaxial accelerometers tested during Operation Snowball, an air blast experiment conducted at Suffield Experimental Station, Alberta, Canada. Values of shock overpressure, duration of positive phase of the shock wave, and impulse derived from the records of these gages are compared to graphs of similar parameters plotted from measurements obtained by Project 1.1 which was responsible for making primary measurements of the air blast parameters. (Author)
AD-651 041 HC$3.00 MF$0.65

SIMPLE INTERNAL BALLISTICS THEORY FOR SINGLE AND DOUBLE CHAMBER GUNS.
Mcgill Univ., Montreal (Quebec). Space Research Inst.
G. V. Parkinson. 26 Aug 66, 24p SRI-H-TN-4

Descriptors: *Ballistics, *Gas dynamics, *Gun, Chamber, Dynamics, Equation, Flow, Gas, Harp project, Heat transfer, Ignition, Internal, Piston, Pressure, Projectile, Weight.

For abstract, see STAR 05 11.
N67-23428 HC$3.00 MF$0.65

19E. FIRE CONTROL AND BOMBING SYSTEMS

FLUID CONTAMINATION IN TRAIN AND EVALUATION POWER DRIVES.
Franklin Inst Research Labs Philadelphia Pa
For primary bibliographic entry see Field 11H.
AD-650 632 HC$3.00 MF$0.65

19G. ROCKETS

ELECTROMAGNETIC MEASUREMENTS OF ACCELERATION.
Utah Univ Salt Lake City Upper Air Research Labs
For primary bibliographic entry see Field 20N.
AD-651 161 HC$3.00 MF$0.65

20. PHYSICS

20A. ACOUSTICS

TABLES OF SPHEROIDAL WAVE FUNCTIONS. PART 2 - PROLATE RADIAL FUNCTIONS OF THE FIRST AND SECOND TYPE.
Naval Research Lab Washington D C
For primary bibliographic entry see Field 12A.
AD-650 575 HC$3.00 MF$0.65

PHONON AND ELECTRON DRAG COEFFICIENTS IN SINGLE-CRYSTAL ALUMINUM.
Technical rept.,
Columbia Univ New York Inst for the Study of Fatigue and Reliability
Warren P. Mason, and Arthur Rosenberg. 10 Jun 66, 12p Rept no. TR-43
Contract Nonr-266 (91)
Availability: Published in Physical Review v151 n2 p434-41 Nov 1966.

Descriptors: (*Aluminum, Acoustic properties), (*Phonons, Aluminum), Electrons, Drag, Single crystals, Shear stresses, Transport properties, Dislocations, Attenuation, Viscosity, Mechanical waves.

Measurements have been made of the attenuation of the fast and slow shear waves along the 110 direction in an aluminum single crystal in the frequency range from 30 MHz to 170 MHz and in the temperature range 66K to 300K. The attenuation can be divided into a square-law frequency term and a term consistent with the theoretical form of the dislocation attenuation at high frequencies. On account of the fact that aluminum has three free electrons per atom and a low resistivity, the attenuation due to electron viscosity is large enough to measure at room temperature, and at low temperatures contributes the principal square-law component. The difference between the measured value and the electron component can be used to evaluate the phonon-viscosity square-law component. The asymptoic value of the dislocation attenuation can be used to evaluate the drag coefficient, and for the first time a definite electron drag coefficient is demonstrated. The measurements can be used to establish a ratio of 3.4 between the limiting nonlinearity radii for electrons and phonons. While the absolute value cannot be obtained with accuracy by this method-on account of a lack of knowledge of the number N of dislocations per cc-theory indicates that the value should be between 0.0009 and 0.0016 dyn sec/sq.cm, which is a relatively large damping coefficient. (Author)
AD-650 612 Not available from CFSTI.

GENERAL RECIPROCITY RELATION,
David Taylor Model Basin Washington D C Structural Mechanics Lab
George Chertock. Oct 62, 4p
DTMB-1663
Availability: Published in Journal of Acoustical Society v34 n7 p989 Jul 1962.

Descriptors: (*Sound, Theorems), Surfaces, Vibration, Force (Mechanics), Mathematical analysis.
Identifiers: Reciprocity relations.

A reciprocity relation is derived between the radiation field of a surface vibrating in an arbitrary mode with arbitrary time dependence, and the generalized force exerted on the surface in the same mode by an external source with the same time dependence. (Author)
AD-650 700 Not available from CFSTI.

ONSET OF ULTRASONIC CAVITATION IN TAP WATER.
David Taylor Model Basin Washington D C Hydromechanics Lab

For primary bibliographic entry see Field 20D.
AD-650 701
t available from CFSTI.

SPLASHES AS SOURCES OF SOUND IN LIQUIDS.
David Taylor Model Basin Washington D C Hydromechanics Lab
G. J. Franz. 14 Jul 58, 22p
DTMB-1396
Availability: Published in Journal of the Acoustical Society of America v31 n8 p1080-96 Aug 1959.

Descriptors: (*Water entry, *Sound), Impact shock, Underwater sound, Sources, Drops, Sprays, Spheres, Wedges, Conical bodies, Raindrops, Mathematical analysis.

The mechanisms of sound production by the splashes made by the gas-to-liquid entry of objects are discussed. The sound from the splash is considered to be associated with acoustic multipoles of all orders, the main ones being simple sources, dipoles, and quadrupoles. The orders of the multipoles that predominate during the various phases of the splash are estimated from the flow and boundary conditions. The sounds radiated into the water by the low-velocity vertical entry of single water droplets, sprays of water droplets, and various other objects, such as spheres, cones, and wedges, were measured and found to have the characteristics of acoustic dipoles. The extensive experimental data on the spectrum of the underwater sound from the splashes of droplets and sprays and the scaling laws for dipoles are used to estimate the spectrum levels of the underwater sound from the splashing of rain on the surface of a sea in terms of the rate of rainfall. (Author)
AD-650 702 Not available from CFSTI.

THEORETICAL STUDY OF THE PROPAGATION OF INTRASONIC WAVES IN THE ATMOSPHERE.
Final rept., Jan 64-Feb 67,
Avco Corp Wilmington Mass Avco Space Systems Div
Allan D. Pierce, and Charles A. Moo. Feb 67, 66p
Rept no. AVSSD-0059-67-RR
AFCRL-67-0172
Contract AF 19 (628)-3891

Descriptors: (*Acoustics, Atmosphere), Theory, Propagation, Gravity, Wind, Atmosphere models, Sound, Nuclear explosions, Explosion effects.

The theory of the propagation of long-period infrasonic waves from nuclear explosions in the atmosphere is reviewed and the extensions of the theory developed under Contract AF19 (628)-3891 are described. A simple demonstration of the theoretical basis of amplitude-yield proportionality is given and work on the extension of the normal mode method to include non-stratified windy atmospheres is described. The formulation for incorporating wind effects into theoretical models is reviewed. A justification of the multilayer method is given and numerical results based on this approximation are summarized. The report includes a listing of all reports, journal articles, and symposia papers written under the contract and includes an extensive bibliography on atmospheric waves and nuclear explosions. Recommendations for future research are given. (Author)
AD-650 752 HC$3.00 MF$0.65

A SURVEY OF CORRELATION LENGTH MEASUREMENTS OF THE VORTEX SHEDDING PROCESS BEHIND A CIRCULAR CYLINDER.
Massachusetts Inst of Tech Cambridge Engineering Projects Lab
For primary bibliographic entry see Field 20D.
AD-650 849 HC$3.00 MF$0.65

A STRONG, SEASONAL BIO-ACOUSTIC SOURCE OF THE EASTERN CARIBBEAN.
Columbia Univ Dobbs Ferry N Y Hudson Labs
For primary bibliographic entry see Field 8A.
AD-650 852 HC$3.00 MF$0.65

A PREDICTION MODEL FOR SHALLOW WATER SOUND TRANSMISSION.
Naval Ordnance Lab White Oak Md
Robert J. Urick. 14 Feb 67, 40p Rept no. NOLTR-67-12

Descriptors: (*Underwater sound, *Sound transmission), Mathematical models, Mathematical prediction, Propagation, Ocean bottom, Shallow water.

For predicting the transmission loss to long ranges in shallow water with downward refraction, when only a frequency knowledge about the bottom is available, a theoretical model is derived leading to a particularly simple expression for the loss in terms of the water depth velocity gradient and bottom reflection loss at small grazing angles. This latter quantity, for which no measurements are extant, is approximated through computed curves of reflection loss at the boundary of a semi-infinite absorptive fluid. A test of the model is provided by two sets of field data. One consists of recent measurements by NEL at 1.5 kHz, along with core sample measurement of bottom density and sound velocity, in several Pacific Ocean areas. The other comprises a hitherto-unpublished transmission survey at 12 kHz made in 1944 by WHOI around our East and Gulf coasts. For this mass of data, the only information about the bottom is contained in words like 'mud' and 'sand'. Reasonable agreement with both sets of data is found. The model appears to be useful for making approximate predictions of transmission loss in shallow water. (Author)
AD-650 874 HC$3.00 MF$0.65

FINAL TECHNICAL REPORT.
Rensselaer Polytechnic Inst Troy N Y Dept of Mathematics
For primary bibliographic entry see Field 17A.
AD-650 966 HC$3.00 MF$0.65

MICROWAVE RESEARCH.
Stanford Univ Calif Microwave Lab
For primary bibliographic entry see Field 20E.
AD-650 971 HC$3.00 MF$0.65

REFRACTED/REFLECTED RAY TRANSMISSIONS IN A DIVERGENT CHANNEL.
Rensselaer Polytechnic Inst Troy N Y 33
Melvin J. Jacobson, and John G. Clark. 1967, 11p

Contract N00014-67-A-0117-0002
Prepared in cooperation with Miami Univ., Fla. Institute of Marine Science, Contrib-757, Contract Nonr-840 (16), Proj. NR-187-300.
Availability: Published in The Journal of the Acoustical Society of America v41 n1 p167-76 Jan 1967.

Descriptors: (*Underwater sound, Sound transmission), Ocean bottom, Refraction, Reflection, Phase shift, Geometry.

Refracted/bottom-reflected ray transmissions in a divergent channel are studied when the sound velocity decreases linearly with depth. Ray geometry is examined in detail and, for a fixed source and receiving point, the number of arrivals, travel time, and spreading loss are found. For the source and receiving point on the channel bottom, bounds on the acceptable initial inclination angle, travel time, number of bottom reflections, and spreading loss are determined. Further, spreading losses in divergent and horizontal channels are compared. Spreading loss is also examined at all points along a ray emanating from a bottom source. In an example, bottom loss and bottom phase shift are superimposed upon spreading loss and travel-time phase shift, respectively, and the concept of bottom-induced interference is discussed. (Author)
AD-651 032 Not available from CFSTI.

INVESTIGATION TO DEFINE THE PROPAGATION CHARACTERISTICS OF A FINITE AMPLITUDE ACOUSTIC PRESSURE WAVE.
North American Aviation, Inc., Downey, Calif.
J. W. Cottrell, and A. C. Peter. Apr 67, 98p
NASA-CR-736
Contract NAS8-11441

Descriptors: *Acoustic nozzle, *Entropy, *Noise propagation, *Pressure wave, Acoustic, Aerodynamic, Amplitude, Attenuation, Characteristics, Finite, Generation, Noise, Nozzle, Plug, Pressure, Propagation, Shock, Wave.

For abstract, see STAR 05 11.
N67-21981 HC$3.00 MF$0.65

A NEW EFFECT IN THE LOW MAGNETIC FIELD ULTRASONIC ATTENUATION OF IMPURE SUPERCONDUCTING NIOBIUM.
Westinghouse Electric Corp., Pittsburgh, Pa. Research Labs.
For primary bibliographic entry see Field 20L.
For abstract, see STAR 05 11.
N67-22473 HC$3.00 MF$0.65

PROPOSED EXPERIMENTS FOR INVESTIGATING THE CHARACTERISTICS AND STABILITY OF ACOUSTIC TRANSMISSION PROPERTIES OF NORWEGIAN COASTAL WATERS.
Norwegian Defence Research Establishment, Kjeller.
F. Bryn. Aug 66, 23p U-191, REPT.-2526/66/ NDRE/161
Contract N62558-3732

Descriptors: *Acoustic stability, *Sound transmission, *Underwater sound, Acoustic, Channel, Detector, Equipment, Experiment, Ocean, Property, Sound, Stability, Transmission, Underwater, Wave.

For abstract, see STAR 05 11.
N67-23134 HC$3.00 MF$0.65

20B. CRYSTALLOGRAPHY

STRAIN WAVES IN A 6-CONSTANT CUBIC CRYSTAL.
Rensselaer Polytechnic Inst Troy N Y Dept of Mechanics
H. S. Paul, and W. H. Hoppmann, II. Apr 67, 29p
Contract DA-30-069-AMC-589 (R)

Descriptors: (*Crystals, Propagation), Mechanical waves, Equations of motion, Vibration, Boundary value problems.

The analysis is concerned with wave propagation in a 6-constant centrosymmetric cubic crystal. Plane waves propagating in the directions (1,1,l), (l,m=l,n) and (l,m,0) are studied. Vibrational waves in an infinite prism are considered. An attempt has been made to analyze the vibration of a cube. It is found that some of the boundary conditions are unsatisfied. But this difficulty can be overcome by considering an infinite thick plate. Vibrational waves in an infinite thick plate bounded by two planes of symmetry are investigated. It may be mentioned that the analysis for the waves in (1,1,0) directions will be similar to that of the third problem. The lowest symmetric and antisymmetric modes of waves in cubic crystalline plates are discussed. Both modes change to surface modes whenever surface modes are possible along the direction of propagation. (Author)
AD-650 562 HC$3.00 MF$0.65

THE PLASTIC DEFORMATION OF MAGNESIUM.
Michigan Univ Ann Arbor Dept of Chemical and Metallurgical Engineering
For primary bibliographic entry see Field 11F.
AD-650 746 HC$3.00 MF$0.65

A STUDY OF RANDOM NETWORK MODELS. CHARACTERIZATION OF A 300-UNIT TETRAHEDRAL NETWORK AND COMPARISON WITH VITREOUS SILICA AND LIQUID WATER.
Melpar Inc Falls Church Va
For primary bibliographic entry see Field 7D.
AD-650 754 HC$3.00 MF$0.65

DEPOSITION OF CARBON ON DIAMOND SEED CRYSTALS,
Case Inst of Tech Cleveland Ohio
John C. Angus, and Herbert Will. 20 Feb 67, 19p
Rept no. Scientific-5
AFCRL-67-0155
Contract AF 19 (628)-4785
See also AD-642 786.

Descriptors: (*Diamonds, *Crystal growth), Carbon, Vapor plating, Deposits, X-ray diffraction analysis, Electron diffraction analysis, Density, Doping, Laboratory equipment.

Progress was made towards establishing the practicality of growing diamond crystals at low pressures for potential device application. The program of depositions of carbon on diamond seed crystals was continued and non-graphitic surface layers were still found deposited on diamond from methane gas. The crystallographic nature of these layers is being investigated by X-ray and electron diffraction and precision density measurements. The evidence from many experiments, although not conclusive, indicates the surface layers are diamond. The experimental equipment was modified to permit wider variations in deposition conditions and the addition of a dopant gas. (Author)
AD-651 059 HC$3.00 MF$0.65

MAGNETIC RELAXATION IN CRYSTALS.
Washington Univ Seattle
For primary bibliographic entry see Field 20H.
AD-651 133 HC$3.00 MF$0.65

RESEARCH IN PURIFICATION AND SINGLE CRYSTAL GROWTH OF II-VI COMPOUNDS.
Eagle-Picher Industries Inc Miami Okla Miami Research Labs
For primary bibliographic entry see Field 20L.
AD-651 140 HC$3.00 MF$0.65

THE PROBABILITY DISTRIBUTION OF THE DISTANCES BETWEEN ATOMS IN A LATTICE,
Boeing Scientific Research Labs Seattle Wash Solid State Physics Lab
Peter Gruner. Jan 67, 36p Rept no. D1-82-0593

Descriptors: (*Copper, Crystal lattices), (*Crystal lattices, Statistical distributions), Atoms, Vibration, Probability, Distribution functions, Statistical mechanics, Wave functions, Quantum statistics.

The thermal vibrations in a lattice cause fluctuations of the interatomic distances. The probability distribution of those distance changes is derived by using the distribution function of the displacements from the equilibrium positions of the atoms. Numerical results are given for copper in the low temperature range where the crystal can be approximated by an elastic continuum. (Author)
AD-651 146 HC$3.00 MF$0.65

GROWTH AND CHARACTERIZATION OF BETA-SILICON CARBIDE SINGLE CRYSTALS.
Final scientific rept., 16 May 64-15 Jan 67,
Stanford Research Inst Menlo Park Calif 0511
W. E. Nelson, A. Rosengreen, R. W. Bartlett, F. A. Halden, and L. E. Marsh. Feb 67, 81p
AFCRL-67-0218
Contract AF 19 (628)-4190

Descriptors: (*Crystal growth, *Silicon), (*Single crystals, *Carbides), Solutions, Neutron activation, Beta particles, Tantalum, Boundary layer, Solvents, Twinning (Crystallography), Additives, Low-temperature research, Hall effect, Measurement, Atoms, Ionization, Scattering, X-ray diffraction analysis.

The process for growing Beta-silicon carbide single crystals from solution in carbon-saturated silicon melts was examined to determine how larger crystals may be obtained. Observed crystal growth effects resulting from increasing the carbon solute transport rate by stirring the solution are described and correlated with boundary layer theory. Both forward growth of platelets into the solution and lateral growth of platelets were accelerated by stirring. However, crystal growth in the forward direction was eventually limited by a boundary layer region, beyond which the solution was no longer supersaturated. Because of the decrease in boundary layer thickness with increasing stirring speed, the terminal lengths of silicon carbide platelets decrease with increasing stirring speed. Agreement between calculated crystal platelet lengths and experimental platelet lengths is good except at very low stirring speeds where free convection fluid motion is greater than the fluid motion caused by stirring. Large single-crystal Beta-silicon carbode platelets were grown in experiments in which convective stirring was reduced by crucible geometry and shielding. Addition of trace amounts of tantalum to the silicon melt improved the surface quality of crystals grown under conditions that normally favor the growth of coarse platelets.
AD-651 151 HC$3.00 MF$0.65

PLASTIC DEFORMATION IN ORDERED SOLID SOLUTIONS AND ITS EFFECTS ON PHYSICAL PROPERTIES.
Comision Nacional de Energia Atomica San Carlos de Bariloche (Argentina) Centro Atomico Bariloche
For primary bibliographic entry see Field 11F.
AD-651 192 HC$3.00 MF$0.65

A REFINEMENT OF THE PARAMETERS OF ALPHA MANGANESE.
Technical rept.,
Army Materials Research Agency Watertown Mass
Charles P. Gazzara, Raymond M. Middleton, R. J. Weiss, and E. O. Hall. Mar 67, 15p Rept no. AMRA-TR-67-08

Descriptors: (*Manganese, *Crystal structure), X-ray diffraction analysis, Cryogenics, Low-temperature research, Experimental data.

The atomic parameters of alpha manganese, first determined by Bradley and Thewlis (1927), have been refined from an R index of 0.093 to a final R of 0.029 for fifty reflections. This refinement was based on an analysis of the integrated intensities of X-ray diffracted powder peaks measured independently at two laboratories. The lattice constant of alpha manganese was determined from liquid helium temperature up to room temperature and a change in the thermal expansion coefficient was found in the vicinity of the Neel temperature (95 K) although no structural change was observed in this region. (Author)
AD-651 205 HC$3.00 MF$0.65

SPACE ENVIRONMENTS - THEIR EFFECTS ON SPACECRAFT DESIGN.
European Space Technology Center, Noordwijk (Netherlands).
S. L. Entres. Nov 66, 23p ESRO-TM-47
Presented At the Esro Summer School, Oxford, 12 Aug. 1964

Descriptors: *Heat sink, *Space environment, *Spacecraft design, *Weightlessness simulation, Conference, Design, Effect, Environment, Heat, Laboratory, Orbit, Radiation, Simulation, Sink, Space, Spacecraft, Thermal, Vacuum, Vehicle, Weightlessness.

For abstract, see STAR 05 11.
N67-22500 HC$3.00 MF$0.65

THE DISPERSION CURVE FOR ROTATION VIBRATION OF A TETRAHEDRAL MOLECULE IN A FACE-CENTERED GRID WITH TETRAGONAL MOLECULAR ORIENTATION.
Kernforschungsanlage, Juelich (West Germany). Institut Fuer Reaktorwerkstoffe.
For primary bibliographic entry see Field 7D.
For abstract, see STAR 05 11.
N67-23027 HC$3.00 MF$0.65

20C. ELECTRICITY AND MAGNETISM

INSTRUMENTATION SYSTEM FOR EVALUATION OF AUTOMATIC DEGAUSSING CONTROL SYSTEMS.
David Taylor Model Basin Washington D C 0900
For primary bibliographic entry see Field 13J.
AD-650 595 HC$3.00 MF$0.65

EXPERIMENTAL INVESTIGATION OF SATURATION EFFECTS IN FERRITE FREQUENCY DOUBLERS,
Stanford Univ Calif Microwave Lab
For primary bibliographic entry see Field 9E.
AD-650 755 Not available from CFSTI.

A SIMPLE EPR SPECTROMETER,
Foreign Technology Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 7D.
AD-651 083 HC$3.00 MF$0.65

FUNDAMENTALS OF MAGNETISM IN METALS. CHAPTER 10,
Yeshiva Univ New York Belfer Graduate School of Science
For primary bibliographic entry see Field 20L.
AD-651 120 Not available from CFSTI.

UNIQUE DETERMINATION OF EDDY CURRENT FLOW PATTERNS FROM MEASUREMENT OF EXTERNAL FIELDS,
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
For primary bibliographic entry see Field 18D.
For abstract, see NSA 21 09.
BNWL-364 HC$3.00 MF$0.65

EXPLOSIVE TECHNIQUES FOR APPLICATIONS IN EXPERIMENTAL PHYSICS.
Comitato Nazionale Per L Energia Nucleare, Frascati (Italy). Laboratorio Gas Ionizzati.
F. Herlach, and H. Knoepfel. Jul 65, 61p LGI-65-17
Sponsored in Part By Euratom

Descriptors: *Compression wave, *Explosive, *Magnetic field, Acceleration, Compression, Detonation, Device, Energy, Experiment, Field, Flux, Implosion, Jet, Liner, Magnetic, Metal, Physics, Source, Wave.

For abstract, see STAR 05 11.
N67-22488 HC$3.00 MF$0.65

NINETEEN-SIXTY-SIX SESSION OF THE GODDARD SUMMER WORKSHOP FINAL REPORT.
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
For primary bibliographic entry see Field 4A.
For abstract, see STAR 05 11.
N67-22741 HC$3.00 MF$0.65

THE EMISSION OF ELECTRONS FROM HOT SILICON SURFACES.
Eidgenossische Technische Hochschule, Zurich (Switzerland).
A. H. Madjid. 1965, 34p
Its Dissertation No. 3672

Descriptors: *Electron emission, *Silicon, Anisotropy, Current, Density, Distribution, Electron, Emission, Energy, Hot surface, Saturation, Theory.

For abstract, see STAR 05 11.
N67-22998 HC$3.00 MF$0.65

CURRENT DISTRIBUTION TO A PLANE SHIELDED CATHODE IN THE ABNORMAL GLOW DISCHARGE.
Dow Chemical Co., Golden, Colo. Rocky Flats Div.
J. R. Mullaly. 10 Feb 67, 24p
Contract AT (29-1)-1106

Descriptors: (*Glow discharges, Cathodes), (*Electric discharges, Electric currents), Electricity, Electrical corona.

For abstract, see NSA 21 09.
RFP-792 HC$3.00 MF$0.65

20D. FLUID MECHANICS

APPARATUS FOR STUDY OF FLUID MOTION IN A SPINNING CYLINDER.
Technical note,
Ballistic Research Labs., Aberdeen Proving Ground, Md.
Harold M. Stoller. Oct 60, 17p BRL-TN-1355

Descriptors: (*Cylindrical bodies, *Fluid flow), Spin, Test equipment, Instrumentation, Rotation, Projectiles.

The report describes an apparatus for investigation fluid motion in a spinning cylinder. The description covers the apparatus, experimental techniques and instrumentation associated with current studies, and a brief discussion on the uses of the apparatus. (Author)
AD-247 552 HC$3.00

NOTE ON THE CONCEPT OF BLUNT TRAILING EDGE BLADES.
Von Karman Inst for Fluid Dynamics Rhode-Saint-Genese (Belgium)
J. Chauvin, and F. Breugelmans. Jan 67, 37p Rept no. Scientific-2, Internal note-21
ARL-67-0063
Grant AF-EOAR-65-65

Descriptors: (*Axial-flow compressor blades, *Blunt bodies), (*Trailing edge, Blunt bodies), Supersonic flow, Deceleration, Subsonic flow, Transonic flow, Compressor rotors, Belgium.

The concept of blunt trailing edge blading for use in supersonic axial compressors is described, and its expected advantages and disadvantages are discussed. Its basic features - the possibility of decelerating a supersonic flow to subsonic velocities by means of a multiple shock system - are shown to be valid, as well as the possibility of having efficient deceleration by a sudden increase in flow passage area, if this change of area is kept within certain limits. Use of a constantly diverging section proves beneficial for operation in subsonic, transonic and supersonic flows. The advantage of using a twisted blading for the rotor is shown by the experimental results. Satisfactory cascade, rotor and stage performances were obtained with a wide range of bladings using the concept, from subsonic to supersonic speeds. Its potential could be used in both low and high hub to tip ratio supersonic compressor stages. (Author)
AD-650 606 HC$3.00 MF$0.65

STUDY OF STACK-GAS FLOW ON LSD28- AND LSD32-CLASS SHIPS FROM TESTS WITH MODEL 4552 IN THE CIRCULATING-WATER CHANNEL.
David Taylor Model Basin Washington D C Hydromechanics Lab
For primary bibliographic entry see Field 13J.
AD-650 608 HC$3.00 MF$0.65

HYDRODYNAMIC DESIGN AND EVALUATION OF A SIZE 5 REINFORCED-PLASTIC MINE-SWEEPING FLOAT.
David Taylor Model Basin Washington D C
For primary bibliographic entry see Field 13J.
AD-650 636 HC$3.00 MF$0.65

COMPARISON BETWEEN MOLECULAR AND TURBULENT DIFFUSION PROCESSES.
David Taylor Model Basin Washington D C Applied Mathematics Lab
F. N. Frenkiel. Jul 59, 14p
DTMB-1320
Contract NOrd-7386
Research supported in part by contract NOrd-7386; Johns Hopkins Univ., Silver Spring, Md. Applied Physics Lab.
Availability: Published in Proceedings of the International Symposium on Transport Processes in Statistical Mechanics, Brussels, August 27-31, 1956.

Descriptors: (*Turbulence, Statistical analysis), (*Diffusion, Theory), (*Molecular properties, Diffusion), Statistical mechanics, Correlation techniques, Equations.

The use of Lagrangian and Eulerian descriptions of a turbulent field is reviewed and some of the differences between molecular and turbulent diffusion processes are described. (Author)
AD-650 698 Not available from CFSTI.

ONSET OF ULTRASONIC CAVITATION IN TAP WATER.
Doctoral thesis,
David Taylor Model Basin Washington D C Hydromechanics Lab
M. Strasberg. 23 May 58, 18p
DTMB-1323
Availability: Published in Journal of the Acoustical Society of America v31 n2 p163-76 Feb 1959.

Descriptors: (*Cavitation, *Ultrasonic radiation), Bubbles, Air, Diffusion, Resonators, Pressure, Probes.

The conditions influencing the onset of acoustically-induced cavitation in tap water were investigated, with special attention to the effect of air-filled cavitation nuclei. Cavitation was induced by exciting an acoustic radial mode in the water in a spherical resonator at a frequency near 25 kc/sec. Air-filled nuclei were detected by observing the reverberant decay of sound in the resonator at frequencies from 150 to 550 kc/sec, the presence of air nuclei causing an increase in the decay rate. Measurements were made of the sound pressure required for cavitation inception, and of the content of air nuclei, for the following treatments of the water: (1) allowing the water to stand undisturbed after drawing from the tap, (2) partially deaerating the water, and (3) subjecting the water to increased static pressure. Some measurements were also made of the threshold for rectified diffusion into air bubbles. The experimental results were compared with theoretical predictions based on three alternate forms of air nuclei: (1) free air bubbles, (2) air trapped in cracks on suspended solid particles, and (3) air bubbles surrounded by skins of organic impurities. (Author)
AD-650 701 Not available from CFSTI.

SPLASHES AS SOURCES OF SOUND IN LIQUIDS.
David Taylor Model Basin Washington D C Hydromechanics Lab
For primary bibliographic entry see Field 20A.
AD-650 702 Not available from CFSTI.

THE DAMPING OF AN OSCILLATING ELLIPSOID NEAR A FREE SURFACE.
David Taylor Model Basin Washington D C Hydromechanics Lab
For primary bibliographic entry see Field 13J.
AD-650 703 Not available from CFSTI.

THE MAINTENANCE OF REYNOLDS STRESS IN TURBULENT SHEAR FLOW.
Technical rept.,
Hydronautics Inc Laurel Md
O. M. Phillips. 7 Jan 66, 14p Rept no. Hydro-TR-353-3
Contract Nonr-4181 (00)
Prepared in cooperation with Johns Hopkins Univ., Baltimore, Md., Dept. of Mechanics, Contract Nonr-4010 (05).
Availability: Published in Journal of Fluid Mechanics v27 pt1 p131-44 1967.

Descriptors: (*Turbulence, *Shear stresses), Reynolds number, Perturbation theory, Mathematical analysis, Velocity.
Identifiers: Shear flow.

A mechanism is proposed for the manner in which the turbulent components support Reynolds stress in turbulent shear flow. This involves a generalization of Miles's mechanism in which each of the turbulent components interacts with the mean flow to produce an increment of Reynolds stress at the 'matched layer' of that particular component. The summation over all the turbulent components leads to an expression for the gradient of the Reynolds stress in the turbulence. (Author)
AD-650 732 Not available from CFSTI.

DENSITY-FRINGE SHIFT RELATIONSHIP FOR AXISYMMETRIC INTERFEROGRAMS.
Memorandum rept.,
Ballistic Research Labs Aberdeen Proving Ground Md
James W. Bradley. Jan 67, 19p Rept no. BRL-MR-1816
Availability: Published in SIAM Journal or Journal Applied Physics.

Descriptors: (*Gas flow, Optical analysis), Interferometers, Density, Integral equations, Integral transforms.

The integral equations relating density and fringe shift are simplified in this report by changing the independent variable. It is pointed out that the density behaves as the derivative of order one-half of the fringe shift, so that the difficulties in obtaining valid numerical results are related to the difficulties of numerical differentiation. Finally, an expression is derived for the density in terms of the Laplace transform and its inverse; this expression can be manipulated mathematically more easily than can the equivalent integral form. (Author)
AD-650 742 Not available from CFSTI.

SPECIES DIFFUSION IN THE FROZEN LAMINAR BOUNDARY LAYER ON A CATALYTIC FLAT PLATE,
Cornell Aeronautical Lab Inc Buffalo N Y 33
R. J. Vidal. Apr 67, 34p Rept no. CAL-AG-1905-A-2
AEDC-TR-67-88
Contract AF 40 (600)-1093

Descriptors: (*Laminar boundary layer, Diffusion), Theory, Density, Temperature, Viscosity, Energy, Disks, Probes, Heat transfer, Skin friction.

A theoretical solution is presented for species diffusion in the compressible laminar boundary layer on a flat plate for frozen gas-phase chemistry. It is assumed that the recombination at the wall is a first-order reaction, and the chordwise concentration gradients are neglected. The solution parallels Crocco's treatment except for the assumption governing the viscosity variations with temperature. A modified Chapman-Rubesin constant is used here, and it is assumed that the product of the density and viscosity varies as a power of the static enthalpy. This makes it possible to closely approximate the actual rho mu- product in the vicinity of the wall. The solution for the species equation and the energy equation are obtained in terms of the shear in the boundary layer. The latter is determined following an empirical calculation used by Young. The result given here should be somewhat more general since the Prandtl number effects are included in a more complete fashion. The solutions for heat transfer and skin friction are compared with existing exact numerical solutions to show that they agree with typical errors of about 5 percent. (Author)
AD-650 766 HC$3.00 MF$0.65

LENINGRAD. POLYTECHNIC INSTITUTE. TRANSACTIONS: NO. 248, 1965. SELECTED ARTICLES,
Foreign Technology Div Wright-Patterson AFB Ohio
L. G. Loitsyanskii, L. M. Simuni, and Yu. V. Lapin. 5 Dec 66, 45p Rept no. FTD-TT-65-1713/TT-67-61600
Edited trans. of Politekhnicheskii Institut, Leningrad. Trudy (USSR) n248 p45-58 1965.

Descriptors: (*Boundary layer, Scientific research), Laminar boundary layer, Numerical analysis, Axially symmetric flow, Heat transfer, Recombination reactions, Catalysis, Vortices, USSR.

Contents: Parametric method of integrating the equations of a laminar boundary layer, by L. G. Loytsyanskiy; Numerical solution of equations in the one-parameter theory of boundary layers, L. M. Simuni and N. M. Terent'yev; Axially symmetric laminar boundary layer in a swirling flow, by V. V. Bogdanova; Effect of catalytic recombination on heat transfer in a 'frozen' turbulent boundary layer, by Yu. V. Lapin.
AD-650 807 HC$3.00 MF$0.65

A SURVEY OF CORRELATION LENGTH MEASUREMENTS OF THE VORTEX SHEDDING PROCESS BEHIND A CIRCULAR CYLINDER.
Technical rept.,
Massachusetts Inst of Tech Cambridge Engineering Projects Lab
Clark Graham. 30 Oct 66, 53p Rept no. TR-76028-1
Contract Nonr-3963 (25)

Descriptors: (*Cylindrical bodies, *Vortices), (*Aerodynamic noise, Vortices), Correlation techniques, Boundary layer transition, Wake, Measurements, Flow fields, Flow separation.
Identifiers: Aeolian tones, Vortex shedding.

The results of ten investigations were studied to determine what quantities should be measured and where to measure them to obtain realistic correlation lengths. Some experimenters carried out visual observations to estimate the size of the correlated flow. Others measured the fluctuations in velocity, surface pressures, and sectional loading to obtain correlation coefficients which when integrated give correlation lengths. The purpose of the paper was to determine if consistent values for correlation length can be measured using these various techniques. (Author)
AD-650 849 HC$3.00 MF$0.65

THE UNSTEADY FLOW FIELD ABOUT A RIGHT CIRCULAR CONE IN UNSTEADY FLIGHT.
Final rept.,
General Electric Co Philadelphia Pa Missile and Space Div
E. A. Brong. Jan 67, 94p
AFFDL-TDR-64-148
Contract AF 33 (657)-11411

Descriptors: (*Conical bodies, Flow fields), Flight, Stability, Perturbation theory, Angle of attack, Numerical analysis, Reynolds number, Pitch (Motion), Boundary value problems.

The inviscid flow field about a right circular cone in unsteady planar flight is analyzed by a perturbation technique which is an extension of Stone's treatment of the cone at small yaw. A solution is found in the form of infinite series in the time rates of change of the pitch rate and angle of attack. The linear stability derivatives as well as 'higher order' stability derivatives are presented for a wide range of cone angles and Mach numbers. The stability derivatives as obtained from this solution are compared to results obtained from second order potential theory, Newtonian impact theory, and an unsteady flow theory due to Zartarian, Hsu, and Ashley. Both the potential theory and the impact theory predict that the stability derivative (angle of attack) approaches a value which is on the order of 10 percent to 20 percent of the stability derivative (pitch rate). Numerical results obtained from the present theory are also compared to ground-test data. The agreement is found to be generally good, although the data in some instances indicate a pronounced Reynolds number effect. (Author)
AD-650 869 HC$3.00 MF$0.65

FEASIBILITY STUDY OF THE DETERMINATION OF SHOCK DETACHMENT DISTANCE AND ABLATION ON LUMINOUS BODIES USING A LASER LIGHT SOURCE,
Naval Ordnance Lab White Oak Md
John L. Lankford. 1 Feb 67, 34p Rept no. NOLTR-67-18, Ballistics Research-170

Descriptors: (*Shock waves, Determination), (*Ablation, Determination), (*Lasers, Test equipment), Feasibility studies, Test methods, Luminescence, Ruby, Aerodynamic configurations, Flow visualization.

A laser light source was employed in a shadowgraph system in a 1000-foot hyperballistics range to investigate new techniques for observing the shock shape, detachment distance, and nose shape for luminous and ablating models at hypersonic speeds. Film fogging and distortion, usually present when the aerodynamic heating at high velocities causes ablation and luminosity at the nose of the model, were markedly reduced, using a selective focusing technique and a Q-switched ruby laser light source. Shock detachment distances measured directly from film plates compare well with the results from previous indirect techniques that are not applicable to luminous or ablating bodies. The method described shows promise for application to the study of model recession under simulated re-entry conditions and for investigation of the relation of model shape changes to ablation, shock shape, and shock detachment distance. (Author)
AD-650 875 HC$3.00 MF$0.65

SEPARATION OF GAS MIXTURES IN FREE JETS.
Technical rept.,
Virginia Univ Charlottesville
James B. Anderson. Apr 67, 35p Rept no. PR-113-P
Contract Nonr-3623 (00)
Prepared in cooperation with Princeton Univ., N. J.
Availability: Published in A. I. Ch. E. Journal.

Descriptors: (*Mixtures, Separation), (*Gases, *Diffusion), Jets, Nozzle gas flow, Axially symmetric flow, Helium, Argon, Superaerodynamics.
Identifiers: Squid project.

Spatial distribution of species flux in axisymmetric free jets of helium-argon mixtures were determined experimentally. The experiments encompass the transition range between inviscid and free-molecular flow at the exits of the nozzles forming the jets. Comparison is made with existing theories of separation. The results confirm the validity of recent predictions of diffusive separation for nearly inviscid flow. (Author)
AD-650 877 Not available from CFSTI.

HYDRODYNAMICS OF SLAMMING OF SHIPS,
David Taylor Model Basin Washington D C
For primary bibliographic entry see Field 13J.
AD-650 887 HC$3.00 MF$0.65

EQUILIBRIUM AIR RADIATION FROM THE STAGNATION REGION OF HIGH VELOCITY SPHERES,
Naval Ordnance Lab White Oak Md
For primary bibliographic entry see Field 4A.
AD-650 924 HC$3.00 MF$0.65

A STUDY OF THE FLOW THROUGH A VERTICAL AXIS PROPELLER,
Engineering Research Associates Toronto (Ontario)
For primary bibliographic entry see Field 13J.
AD-650 935 HC$3.00 MF$0.65

THE EXCITATION OF ELECTRONIC AND OTHER DEGREES OF FREEDOM IN A HYPERSONIC SHOCK WAVE IN AIR.
Research paper,
Institute for Defense Analyses Arlington Va Research and Engineering Support Div
Ernest Bauer. Jan 67, 63p Rept no. RP-P-311, IDA/HQ67-5724
Contract DAHC15-67-C-0011

Descriptors: (*Shock waves, *Hypersonic flow), (*Reaction kinetics, Shock waves), (*Atmosphere entry, Shock waves), Molecular energy levels, Excitation, Air, Energy, Chemical reactions, Gas ionization.

A review is given of the overall mechanisms of energy flow between translational, rotational, vibrational, chemical, and electronic degrees of freedom in a shock wave. Particular stress is placed on those aspects of the problem which are not well understood; namely, the mechanism for vibrational excitation and dissociation in high-speed shocks in which the assumptions of weak translation-vibration coupling and dissociation by vibrational ladder-climbing, which apply at room temperature, breakdown. While one can write a set of rate constants for at least the major chemical reactions in air, there is no comparable information on the excitation of electronic degrees of freedom in high-temperature air, and our knowledge of mechanisms is very limited. For illustrative purposes, the case of a shock wave in argon is reviewed. (Author)
AD-650 950 HC$3.00 MF$0.65

THEORETICAL AND EXPERIMENTAL INVESTIGATIONS ON THREE-DIMENSIONAL (LAMINAR AND TURBULENT) BOUNDARY LAYERS, IN PARTICULAR ON PROBLEMS OF TRANSITION, SEPARATION AND REATTACHMENT,
Poitiers Univ (France) Laboratoire de Mecanique des Fluides
E. A. Eichelbrenner, and J-L. Peube. 30 Sep 66, 101p
Contract N62558-3863

Descriptors: (*Turbulent boundary layer, *Flow separation), Three-dimensional flow, Boundary layer transition, Laminar boundary layer, Ellipsoids, Ring wings, Heat transfer, Leading edge, France.

The report is chiefly dedicated to the behavior of separation and reattachment in three-dimensional turbulent boundary layers, in particular on ellipsoids and annular wings.
AD-650 952 HC$3.00 MF$0.65

THE ROLE OF S-SHAPED CROSSFLOW PROFILES IN THREE-DIMENSIONAL BOUNDARY LAYER THEORY.
Final rept.,
Poitiers Univ (France) Laboratoire de Mecanique des Fluides
E. A. Eichlbrenner, and J-L. Peube. 30 Sep 66, 63p
Contract N62558-4460

Descriptors: (*Boundary layer, Flow fields), Turbulent boundary layer, Three-dimensional flow, Mathematical analysis, France.

A method is developed which allows the calculation of characteristic parameters (scale factor delta, main flow parameter m, crossflow parameter Bi) of three-dimensional turbulent boundary layers under the assumption of a third-degree polynomial for the temperature polar. (Author)
AD-650 953 HC$3.00 MF$0.65

SUPERSONIC GAS FLOW PAST A CYLINDRICAL PROTUBERANCE OF A PLATE.
APL library bulletin translations series,
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
D. M. Voitenko, A. I. Zubkov, and Yu. A. Panov. 31 Jan 67, 13p Rept no. TG230-T515
TT-67-61647
Contract NOw-62-0604
Trans. of Akademiya Nauk SSSR. Izvestiya. Mekhanika Zhidkosti i Gaza, n1 p121-5 1966.

Descriptors: (*Cylindrical bodies, *Supersonic flow), Flow separation, Pressure, Flow fields, Wind tunnel models, Leading edge, Vortices, USSR, Three-dimensional flow.

Wind-tunnel investigation was made of the flow past a cylindrical protuberance on a plate at a Mach number of 2.5. The shape of the separation line and the pressure distribution and flow orientation at the surface of the plate, obtained for cylinders of various diameter and height, are presented in graphical form. (Author)
AD-650 960 HC$3.00 MF$0.65

FLUTTER SIMULATION,
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
For primary bibliographic entry see Field 16B.
AD-650 981 HC$3.00 MF$0.65

REAL GAS EFFECTS IN HYPERSONIC AERODYNAMIC HEATING.
Technical rept.,
Texas Univ Austin Defense Research Lab 4410
Dave R. Moore. Jun 62, 33p Rept no. DRL-485 Contract NOrd-16498
Prepared in cooperation with Johns Hopkins Univ., Silver Spring, Md. Applied Physics Lab. CF-2987.

Descriptors: (*Aerodynamic heating, *Hypersonic flow), Laminar boundary layer, Equations, Dissociation, Heat transfer, Cylindrical bodies, Nose cones, Aerospace craft, Shock waves, Recombination reactions, Exchange reactions, Gas ionization.

The report presents a review of some of the problems associated with aerodynamic heating in hypersonic flows. Included in the report are a brief discussion of the chemistry of high temperature air and a discussion of the laminar boundary layer equations in dissociated air. Also presented is a simplified method for calculating the heat transfer rate distribution about the nose of a hemisphere-cylinder body in dissociated air. (Author)
AD-650 984 HC$3.00 MF$0.65

USE OF THE HYSTERESIS LOOP METHOD TO STUDY THIXOTROPIC SUSPENSIONS. PART 2. ACETYLENE BLACK IN HYDRAZINE AND PYROGENIC SILICA IN LIQUIDS OF VARYING POLARITY,
Naval Research Lab Washington D C
For primary bibliographic entry see Field 21I.
AD-651 022 HC$3.00 MF$0.65

EFFECTS OF AN INITIAL GAP ON THE FLOW IN A TURBULENT WALL JET.
Revised ed.,
Windsor Univ (Ontario) Dept of Mechanical Engineering
K. Sridhar, and P. K. C. Tu. 20 Sep 65, 6p
Research supported in part by DRB, and National Research Council of Canada. Revision of manuscript submitted 10 Aug 65.
Availability: Published in Journal of the Royal Aeronautical Society v70 n666 p669-73 Jun 1966.

Descriptors: (*Jets, Turbulence), Walls, Gas flow, Two-dimensional flow, Nozzle gas flow, Leading edge, Canada.

The flow in a two-dimensional plane wall jet with different initial gaps between the nozzle exit and the leading edge of the wall was probed at various stations along the jet. The jet slot thickness and the velocity were kept constant. It was found that the region close to the leading edge of the wall behaved like a transforming region where the type of flow changed from a free jet to a wall jet. The length of this region, which depended directly on the gap size, was so short for small gaps that the gap effects were found to be negligible. In addition, it was found that the inner layer velocity distribution of a wall jet did not follow the classic one-seventh power law. (Author)
AD-651 028 Not available from CFSTI.

FEASIBILITY OF A HIGH PERFORMANCE AERODYNAMIC IMPULSE FACILITY.
Avco Everett Research Lab Everett Mass
For primary bibliographic entry see Field 14B.
AD-651 042 HC$3.00 MF$0.65

RESEARCH ON FLUID DYNAMICAL MODELS OF THE LARGE SCALE ATMOSPHERIC CIRCULATIONS.
Brown Univ Providence R I Dept of Physics
For primary bibliographic entry see Field 4A.
AD-651 046 HC$3.00 MF$0.65

SYMPOSIUM ON INTERDISCIPLINARY ASPECTS OF RADIATIVE ENERGY TRANSFER.
General Electric Co Philadelphia Pa Missile and Space Div
For primary bibliographic entry see Field 20F.
AD-651 048 HC$3.00 MF$0.65

UBER FIN VARIATIONS PROBLEM AUS DER NICHTLINEAREN STABILITATSTHEORIE ZAHER, INKOMPRESSIBLER STROMUNGEN (A Variation Problem Concerning Nonlinear Stability Theory Involving Viscous, Incompressible Flow),
Deutsche Versuchsanstalt Fuer Luft-Und Raumfahrt E V Freiburg-Im-Breisgau (West Germany)
Von Peter Sorger. 6 Aug 65, 17p
Text in German.
Availability: Published in Zeitschrift fuer Angewandte Mathematik und Physik (ZAMP) v17 n2 p201-16 1966.

Descriptors: (*Incompressible flow, Analysis of variance), Stability, Viscosity, Two-dimensional flow, Three-dimensional flow, West Germany.

A variational problem is investigated yielding lower stability bounds for finite disturbances of viscous incompressible flow. Exact solutions of the variational problem are given for some two- and three-dimensional domains, thus considerably improving the bounds obtained by VELTE. (Author)
AD-651 079 Not available from CFSTI.

INVESTIGATION OF THE INTERACTION OF A JET WITH SCREENS LOCATED NEAR,
Foreign Technology Div Wright-Patterson AFB Ohio
O. V. Yakovlevskii, and A. N. Sekundov. 23 Dec 66, 27p Rept no. FTD-HT-66-370
TT-67-61675
Issledovanie Vzaimodeistviya Strui s Blizke Raspolozhennymi Ekranami, unedited rough draft trans. of Akademiya Nauk SSSR. Izvestiya. Mekhanika i Mashinostroenie, n1 p104-14 1964.

Descriptors: (*Jets, Interactions), Turbulence, Lift, Solids, Surfaces, Nozzle gas flow, USSR.

Some results are presented of the investigation of flows brought about by the expansion of a turbulent jet close to the surface of a solid body (screen). A problem of this kind arises, for example, in industrial ventilation, in the dividing up of an onflow among sections, in the study of 'near earth' effects which cause a reduction in the lifting force of the jets of aircraft of vertical takeoff and landing. (Author)
AD-651 085 HC$3.00 MF$0.65

EXPERIMENTAL INVESTIGATION OF INFLUENCE OF TURBULENCE OF FLOW ON HEAT EXCHANGE DURING MOTION OF AIR IN PIPES,
Foreign Technology Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 20M.
AD-651 087 HC$3.00 MF$0.65

JOURNAL OF ENGINEERING PHYSICS: SELECTED ARTICLES, 1964, VOL. 7, NO. 9.
Foreign Technology Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 20M.
AD-651 090 HC$3.00 MF$0.65

WIND-TUNNEL INVESTIGATIONS OF A 1/20-SCALE POWERED MODEL OPEN-OCEAN V/STOL SEAPLANE.
Summary rept.,
David Taylor Model Basin Washington D C Aerodynamics Lab
Richard O. Thomas. Jan 67, 49p Rept no. Aero-1106
DTMB-2181

Descriptors: (*Seaplanes, Model tests), (*Vertical take-off planes, Aerodynamic characteristics), Convertible planes, Flight, Stalling, Wing-body configurations, Canard configuration, Center of gravity, Tilt wings, Design, Hovering.

Low-speed wind-tunnel tests were conducted on a 1/20-scale powered model of a proposed open-ocean V/STOL seaplane design. Hover and transition power required and climb and descent speeds at various flight path angles were determined. The effect of full-span spoilers on wing and canard stalling characteristics through transition was briefly investigated. A comparison of cruise performance of the seaplane and a conventional transport of equivalent size was made. After correction of the seaplane model cruise lift curve and drag polar to full-scale Reynolds number, cruise performance of the seaplane was found to compare favorably with that of the conventional monoplane. In the transition mode, the model is longitudinally unstable at high wing tilts and directionally stable at all wing tilts for the initial center-of-gravity location. With the present relationship of wing, canard, and center of gravity, the model cannot be trimmed in pitch by varying only incidence of the canard with uniform thrust setting on all engines. Differential thrust, the mechanism envisioned for hover control, is necessary for pitch trim and control throughout most of the transition mode. (Author)
AD-651 099 HC$3.00 MF$0.65

RESEARCH ON PROBLEMS OF HIGH SPEED GAS DYNAMICS.
Final rept., 15 Nov 65-16 Sep 66,
Princeton Univ N J Gas Dynamics Lab 3104
S. M. Bogdonoff. Nov 66, 22p
ARL-66-0232
Contract AF 33 (615)-3328

Descriptors: (*Aerodynamics, Reviews), Superaerodynamics, Kinetic theory, Thermal conductivity, Viscosity, Hypersonic flow, Boundary layer, Gas ionization, Gas flow.

A series of fundamental studies was conducted, mostly concentrated in the areas of flows at high Mach number under rarefied conditions but including separated flows and other fundamental fluid mechanical problems. Both experimental and theoretical investigations have been carried out. Brief reviews of the completed works as well as outlines of the studies still in process are included along with a complete listing of all publications and papers generated by the research. (Author)
AD-651 114 HC$3.00 MF$0.65

THE WALL PRESSURE SPECTRA IN A THICK TURBULENT BOUNDARY LAYER,
Taggart (Robert) Inc Fairfax Va
Matthew Stevenson. Apr 67, 26p Rept no. RT-15101
Contract Nonr-4791 (00)

Descriptors: (*Turbulent boundary layer, Pressure), Walls, Thickness, Water tunnels, Spectroscopy, Frequency, Transducers, Noise.

Results are presented of measurements carried out in a quiet flow water tunnel. Boundary layer characteristics are given for a range in maximum flow velocity between 12 and 22 feet/second, and are in the form of the inner semilogarithmic wall law and the velocity defect law. Variation of the displacement thickness with velocity is also shown. From spectrum level curves it is shown that the intensity level falls at a rate of about 10 db/octave with increasing frequency and for any given frequency, the dependence on flow velocity is about 2 db/foot/second over a wide frequency range. Spectral density data are presented in nondimensional form which are in agreement with previously reported results at least beyond a certain frequency. Below this frequency, an apparent increase in spectral density with increase in flow velocity indicates the presence of low frequency tunnel vibration. Qualitatively, however, the low frequency results show a tendency for the spectral density values to decrease with decreasing frequency. At the higher frequencies, the results indicate clearly the inability of the finite sized transducer to resolve the small wave-length components of the pressure field. (Author)
AD-651 130 HC$3.00 MF$0.65

CONTRIBUTIONS TO THE DEVELOPMENT OF A POWER SPECTRAL GUST DESIGN PROCEDURE FOR CIVIL AIRCRAFT.
Lockheed-California Co Burbank
For primary bibliographic entry see Field 1C.
AD-651 131 HC$3.00 MF$0.65

AN EXPERIMENTAL INVESTIGATION OF NONEQUILIBRIUM CORNER EXPANSION FLOWS OF DISSOCIATED OXYGEN,
Toronto Univ (Ontario) Inst for Aerospace Studies
J. E. Drewry. May 67, 114p Rept no. UTIAS-124
AFOSR-67-0554
Grant AF-AFOSR-365-66

Descriptors: (*Oxygen, Nonequilibrium flow), (*Curved profiles, Gas flow), Pressure, Dissociation, Boundary layer, Density, Shock waves, Canada.
Identifiers: Curved flows.

The study consisted of density measurements made with a Mach-Zehnder interferometer and pressure measurements using piezoelectric transducers. In additon, other optical studies (viz., schlieren and shadowgraph) were made to obtain information of a qualitative nature. Two fundamentally different test models were used to generate corner expansion flows in an effort to gain some insight into the nature and extent of boundary layer influence on the final results. The detailed density and pressure results which were obtained indicate a longer relaxation distance than predicted by theoretical calculations based on a partially excited gas model and would appear to favor the predictions of more recent calculations based on a coupled vibration-dissociation model, in lieu of assuming instantaneous vibrational equilibrium. Viscous interaction between the boundary layer and the corner expansion wave tended to modify the experimental results and in some cases was the dominant factor. (Author)
AD-651 141 HC$3.00 MF$0.65

THE PLASTIC RESPONSE OF SOLIDS,
Illinois Univ Urbana
For primary bibliographic entry see Field 20K.
AD-651 153 HC$3.00 MF$0.65

ELASTOHYDRODYNAMIC THEORY OF SPHERICAL BODIES IN NORMAL APPROACH MOTION.
Technical rept.,
Mechanical Technology Inc Latham N Y
H. Christensen. 24 Apr 67, 46p Rept no. MTI-67TR21
Contract N00014-66-C-0037

Descriptors: (*Spheres, Hydrodynamics), Elasticity, Lubrication, Motion, Theory, Films, Lubricants, Pressure, Deformation, Oils, Loading (Mechanics), Equations of motion, Viscosity.
Identifiers: Elasto-hydrodynamic problem.

The elastohydrodynamic problem of normal approach of two spherical bodies is studied and the lubrication and elasticity equations governing this type of motion are established. Numerical solutions to the general case accounting for elastic deformation of the bodies and pressure dependent viscosity are presented. (Author)
AD-651 154 HC$3.00 MF$0.65

EFFECTS OF VISCOELASTIC LUBRICANT ON SQUEEZE FILM LUBRICATION BETWEEN IMPINGING SPHERES.
Mechanical Technology Inc Latham N Y
For primary bibliographic entry see Field 11H.
AD-651 155 HC$3.00 MF$0.65

THE HYPERSONIC WAKE PROGRAM I. A FORTRAN PROGRAM FOR THE INTEGRAL SOLUTION,
Army Missile Command Redstone Arsenal Ala Advanced Systems Lab
James E. Wollrab. 26 May 66, 49p Rept no. RD-TM-66-2

Descriptors: (*Hypersonic flight, *Wake), (*Computer programs, Wake), (*Reentry vehicles, Wake), Blunt bodies, Conical bodies, Pressure, Flow fields, Boundary layer transition, Axially symmetric flow, Chemical reactions.

A FORTRAN program is explicitly listed for the basic integral solution of the wake of a hypersonic blunt or conical reentry body. The near wake pressure gradient, nonequilibrium chemistry, and laminar-turbulent transition are included. (Author)
AD-651 159 HC$3.00 MF$0.65

CASCADE DATA FOR HIGH CAMBER BLUNT TRAILING EDGE BLADES,
Von Karman Inst for Fluid Dynamics Rhode-Saint-Genese (Belgium)
F. Bruegelmans, and C. Sieverding. Nov 66, 47p Rept no. Scientific-1, Internal note-17
ARL-67-0064
Grant AF-EOAR-65-65

Descriptors: (*Blade airfoils, Trailing edge), (*Cascade structures, Transonic flow), Camber, Data, Blunt bodies, Belgium, Mach number, Compressible flow.

A blunt trailing edge blade is tested at inlet Mach numbers varying from 0.60 to 1.00, over an incidence range of -3 to +7 degrees. Increase of the solidity from 2 to 3 increased turning and static pressure coeffcient by 6 degrees and 7% respectively. The corresponding minimum loss coeffficient decreased from 20% to 17%. Important compressibility effects are observed in this high cambered blade passage. This allows back pressure application. Systematic testing is performed for the incidences at Mach number 0.80 and 9.90. (Author)
AD-651 163 HC$3.00 MF$0.65

PENETRATION OF DROPS INTO HIGH-VELOCITY AIRSTREAMS.
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
R. D. Ingebo. Apr 67, 17p NASA-TM-X-1363
Contract 128-31-06-02-22

Descriptors: *Drop size, *Injection, *Penetration, Air, Drop, Fuel, High velocity, Jet, Liquid, Photography, Size, Stream.

For abstract, see STAR 05 11.
N67-22839 HC$3.00 MF$0.65

EXPERIMENTAL INVESTIGATION OF INTERFACIAL BEHAVIOR FOLLOWING TERMINATION OF OUTFLOW IN WEIGHTLESSNESS.
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
L. S. Brubb, and D. A. Petrash. Apr 67, 22p
NASA-TN-D-3897
Contract 124-09-03-01-22

Descriptors: *Cylindrical tank, *Liquid-vapor interface, *Weightlessness, Behavior, Cylinder, Drop, Facility, Flow, Interface, Liquid, Tank, Termination, Test, Vapor.

For abstract, see STAR 05 11.
N67-22865 HC$3.00 MF$0.65

Group 20D—Fluid mechanics

A METHOD OF ASYMPTOTIC EXPANSIONS FOR SINGULAR PERTURBATION PROBLEMS WITH APPLICATION IN VISCOUS FLOW.
National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
E. D. Martin. Apr 67, 77p NASA-TN-D-3899
Contract 124-07-02-23

Descriptors: *Asymptotic function, *Perturbation, *Series expansion, *Viscous flow, Asymptote, Boundary, Expansion, Flow, Function, Hypersonic, Layer, Mathematics, Method, Model, Problem, Series, Solution, Sphere, Viscous.

For abstract, see STAR 05 11.
N67-22867 HC$3.00 MF$0.65

AN OSCILLATORY DISTURBANCE OF RIGIDLY ROTATING FLUID.
Aeronautical Research Labs., Melbourne (Australia). Dept. of Supply.
W. W. Wood. Oct 65, 54p ARL/A-250

Descriptors: *Disturbing function, *Rotating fluid, *Viscosity, Disturbance, Effect, Flow, Fluid, Function, Inviscid, Oscillation, Rigid, Rotation.

For abstract, see STAR 05 11.
N67-22991 HC$3.00 MF$0.65

SUPPLEMENT TO SURVEY OF TECHNOLOGY IN FLUID SUSPENSIONS: PATENT SEARCH AND EFFECTS OF FORWARD SPEED,
Massachusetts Inst. of Tech., Cambridge. Engineering Projects Lab.
For primary bibliographic entry see Field 13F.
PB-173 653 HC$3.00 MF$0.65

TURBINE DROPLET IMPINGEMENT AND RELATED PHENOMENA.
Technical rept.,
Michigan Univ., Ann Arbor. Lab. for Fluid Flow and Heat Transport Phenomena.
Frederick G. Hammitt. Feb 67, 41p Rept. no. 07738-4-T
Grant NSF-GK-730

Descriptors: (*Turbines, *Damage), Cratering, Raindrops, Aircraft, Cavitation, Velocity, Impact tests, Drops, Jet engines.

High-velocity droplet impingement and the resultant damage to materials is an important present day problem in wet vapor turbines. It is also important in rain erosion of supersonic aircraft. Assuming the cavitation microjet model, it might be supposed that cavitation damage tests, which are relatively simple and inexpensive, or jet impact tests which are also relatively easy to perform, could be substituted for impingement tests with spherical droplets, since the latter are made difficult by the unstable nature of a spherical drop moving through a gas with a high relative velocity. However, the effects upon damage of droplet or jet shape and size are not yet well understood, so that methods of scaling or modelling liquid impact tests are not clear. Hence, further detailed information is required before it will be possible to confidently substitute jet impact or cavitation tests for droplet impingement tests. There is the possibility that some of this can be obtained through complex numerical analyses of the impact process using high-capacity, high-speed digital computers. (Author)
PB-174 511 HC$3.00 MF$0.65

20E. MASERS AND LASERS

LASER-PUMPED STIMULATED EMISSION FROM ORGANIC DYES: EXPERIMENTAL STUDIES AND ANALYTIC COMPARISONS,
IBM Watson Research Center Yorktown Heights N Y
P. P. Sorokin, J. R. Lankard, E. C. Hammond, and V. L. Moruzzi. 14 Oct 66, 22p
AROD-3318:44
Contract DA-31-124-ARO (D)-205
Availability: Published in IBM Journal of Research and Development v11 n2 p130-48 Mar-Apr 1967.

Descriptors: (*Lasers, Dyes), (*Dyes, Pumping (Optical)), Emissivity, Coherent radiation, Phthalocyanines, Excitation, Molecular energy levels, Fluorescence, Band spectrum, Transients, Polarization, Flash lamps, S-heterocyclic compounds, N-heterocyclic compounds, Iodides.
Identifiers: Chloraluminum phalocyanines, Diethylthia tricarbocyanine iodides.

Stimulated emission spectra of two organic dyes, chloro-aluminum phthalocyannine (CAP) and 3,3'-diethylthiatricarbocyanine iodide (DTTC) are compared. Giant-pulse ruby laser excitation was used in both cases. An end pumping configuration employed with DTTC resulted in narrow beam divergences and high conversion efficiencies. For CAP, the oscillating transition is one which terminates on an excited vibrational level of the ground electronic state. For DTTC, stimulated emission at the lowest concentrations occurs at the peak of the Franck-Condon-shifted fluorescence band but moves to longer wavelengths as the concentration is increased. The transient behavior of the CAP laser, pumped in a transverse geometry, was observed and compared with computer solutions of the rate equations. Polarization measurements of the laser beams were also made. An analysis is given of requirements for achieving optimal pumping by means of flashlamps. The paper concludes with an addendum reporting recent observations of stimulated emission from dye solutions lasing at wavelengths ranging from blue (4385 A) to orange (6000 A). (Author)
AD-650 736 Not available from CFSTI.

LASER PARAMETER MEASUREMENTS HANDBOOK. VOLUME I.
Final rept.,
H Nu Systems Inc Menlo Park Calif
H. G. Heard. Feb 67, 387p
RADC-TR-66-704-Vol-1
Contract AF 30 (602)-3346
See also AD-650 871, AD-650 872.

Descriptors: (*Lasers, Handbooks), Electrical properties, Optical properties, Measurement, Coherent radiation, Probes, Test equipment, Energy, Power, Calorimetry, Photochemistry, Spectroscopy, Reviews.

The handbook is a compendium of measurement that encompasses the laser technology. It includes a wealth of information gleaned from over 650 articles surveyed in an exhaustive literature search that reviewed American as well as foreign scientific journals, and Government reports. The work contains the contributions of 37 authors whose works were edited to conform with the text and abridged to eliminate redundancy. It is believed that the text treats all of the significant laser measurement techniques that have been published to date in the areas of beam sampling, beam parameters, power, energy, gain, wavelength, bandwidth, coherence and frequency stability. The techniques of modulation and the methods of measurement are treated as are the communication aspects of noise in the laser signal source. This volume contains chapters entitled: Laser parameters and measurement; Beam sampling techniques; Measurement of beam parameters; Measurement of energy and power.
AD-650 870 HC$3.00 MF$0.65

LASER PARAMETER MEASUREMENTS HANDBOOK. VOLUME II.
Final rept.,
H Nu Systems Inc Menlo Park Calif
H. G. Heard. Feb 67, 235p
RADC-TR-66-704-Vol-2
Contract AF 30 (602)-3346
See also AD-650 870, AD-650 872.

Descriptors: (*Lasers, Handbooks), Electrical properties, Optical properties, Measurement, Coherent radiation, Gas lasers, Gain, Plasma medium, Atomic energy levels, Line spectrum, Test equipment, Monochromatic light, Spectroscopy, Reviews.

The Laser Parameter Measurements Handbook is a compendium of measurement that encompasses the laser technology. It includes a wealth of information gleaned from over 650 articles surveyed in an exhaustive literature search that reviewed American as well as foreign scientific journals, and Government reports. This work contains the contributions of 37 authors whose works were edited to conform with the text and abridged to eliminate redundancy. It is believed that the text treats all of the significant laser measurement techniques that have been published to date in the areas of beam sampling, beam parameters, power, energy, gain, wavelength, bandwidth, coherence and frequency stability. The techniques of modulation and the methods of measurement are treated as are the communication aspects of noise in the laser signal source. This volume contains chapters entitled: Measurement of gain parameters; Measurement of wavelength.
AD-650 871 HC$3.00 MF$0.65

LASER PARAMETER MEASUREMENTS HANDBOOK. VOLUME III.
Final rept.,
H Nu Systems Inc Menlo Park Calif
H. G. Heard. Feb 67, 296p
RADC-TR-66-704-Vol-3
Contract AF 30 (602)-3346
See also AD-650 870, AD-650 871.

Descriptors: (*Lasers, Handbooks), Electrical properties, Optical properties, Measurement, Coherent radiation, Bandwidth, Line spectrum, Fluorescence, Doppler effect, Gain, Gas lasers, Interferometers, Stability, Noise, Modulation, Photons, Reviews.

The handbook is a compendium of measurement that encompasses the laser technology. It includes a wealth of information gleaned from over 650 articles surveyed in an exhaustive literature search that reviewed American as well as foreign scientific journals, and Government reports. This work contains the contributions of 37 authors whose works were edited to conform with the text and abridged to eliminate redundancy. It is believed that the text treats all of the significant laser measurement techniques that have been published to date in the areas of beam sampling, beam parameters, power, energy, gain, wavelength, bandwidth, coherence and frequency stability. The techniques of modulation and the methods of measurement are treated as are the communication aspects of noise in the laser signal source. This volume contains chapters entitled: Measurement of bandwidth and coherence; Measurement of frequency stability; Measurement of noise and modulation of laser carriers.
AD-650 872 HC$3.00 MF$0.65

FEASIBILITY STUDY OF THE DETERMINATION OF SHOCK DETACHMENT DISTANCE AND ABLATION ON LUMINOUS BODIES USING A LASER LIGHT SOURCE,
Naval Ordnance Lab White Oak Md
For primary bibliographic entry see Field 20D.
AD-650 875 HC$3.00 MF$0.65

MICROWAVE RESEARCH.
Quarterly status rept. no. 32, 1 Nov 66-31 Jan 67.
Stanford Univ Calif Microwave Lab

Mar 67, 36p Rept no. ML-1515
Contract Nonr-225 (48)
See also AD-645 239.

Descriptors: (*Microwaves, Scientific research), Lasers, Microwave frequency, Oscillation, Semiconductors, Microscopes, Films, Amplifiers, Optics, Acoustics, Waveguides, Scattering.

Topics included are: raman effects, oscillations in semiconductors, acoustic microscope, thin film electroacoustic amplifiers, geometrical optics of acoustic waves, and acoustic waves in semiconductors.
AD-650 971 HC$3.00 MF$0.65

SOLID STATE RESEARCH: 1967:1.
Massachusetts Inst of Tech Lexington Lincoln Lab
For primary bibliographic entry see Field 20L.
AD-651 065 HC$3.00 MF$0.65

RADIATION DAMAGE BY COMPTON SCATTERING IN GAMMA OR X RAY PUMPED OPTICAL MASERS,
Army Missile Command Redstone Arsenal Ala Physical Sciences Lab
R. A. Shatas. 15 Apr 63, 15p Rept no. RR-TN-63-2

Descriptors: (*Lasers, Feasibility studies), Radiation damage, Alkali metal compounds, Fission, Uranium, Compton scattering, Nuclear radiation, Gamma rays, X rays, Pumping (Optical).

The computation of threshold energies of X and gamma rays for the displacement of a lattice element by the nuclear Compton scattering is reported. Numerical results are given for alkali halides and oxides. These computations were carried out as a part of a general feasibility study of direct pumping of optical masers by radiations emitted in the nuclear fission of transactinides. Based on the analysis of the fission data for U235, it is concluded that the direct pumping is not yet technologically feasible because: (1) only a small fraction of the total energy released by the nuclear fission can presently be made available in X rays and gammas, (2) serious radiation damage to the optical maser material would occur if fast neutrons or high energy gammas were used in pumping. The complexity of presently unsolved problems is such that major breakthroughs in both the state-of-the-art of reactor technology and the prevention of radiation damage will be required at first. As an alternate, the conventional conversion of fission energy into electricity and the electrical pumping by carrier injection into recombination radiation devices is suggested. (Author)
AD-651 186 HC$3.00 MF$0.65

LASER DAMAGE: A SELECTED LITERATURE SURVEY.
Special reports no. 60,
Air Force Cambridge Research Labs L G Hanscom Field Mass
Carl A. Pitha. Feb 67, 19p Rept no. AFCRL-67-0137

Descriptors: (*Lasers, Damage), (*Optical equipment, Lasers), Radiation damage, Dielectric properties, Refractive index, Electromagnetic waves, Brillouin zones, Sound, Photons, Absorption, Ruby, Reviews.

This report is a review of selected references dealing with descriptions and possible causes of damage to laser component elements functioning under high-power conditions, or to potential laser component materials exposed to high-power laser beams. Discussed are internal and surface damage, conditions prevailing in materials under lasing conditions, and the mechanisms proposed to account for the accumulation of sufficient energy for damage to take place; that is, self-focusing, stimulated Brillouin scattering, multiphoton absorption, and microplasma generation. Fifty-seven papers, published in 1964 - 1966, are included in the references. (Author)
AD-651 210 HC$3.00 MF$0.65

BROADBAND LASER DIGITAL DEFLECTOR.
Technical rept.,
Army Electronics Command Fort Monmouth N J
S. Leroy Everett, Jr., Robert A. Cicero, and David K. Ruppe. Jan 67, 46p Rept no. ECOM-2795

Descriptors: (*Display systems, Design), (*Lasers, Display systems), Krypton, Elastomers, Rubber, Silicones, Digital Computers, Input-output devices, Spectra (Visible + ultraviolet)

The report describes the design of a broadband laser beam digital deflector feasibility model. This model will be a flexible broadband assembly permitting evaluation of numerous broadbanding techniques. Two methods of externally modifying an existing single wavelength digital deflector are described. Both methods provide a beam deflection system operating throughout the 4500A to 7000A portion of the spectrum. Estimates of light intensity losses are calculated for both methods of external modification. Losses are calculated at the discrete laser wavelength to be used in the Laboratory feasibility model. The theory illustrating the method of compensation required for broadband deflector operation is explained. Sample calculations are included for compensation of a two-color model. Laboratory techniques to facilitate compensation of three- and four-color models are included. Problem areas requiring special investigation are outlined. A literary investigation of index of refraction matching fluids is included as an Appendix. The problems encountered with previously used fluids in the deflector and their possible solutions are discussed. Conclusions and recommendations concerning investigation of problem areas and laboratory fabrication of the feasibility model are given. (Author)
AD-651 220 HC$3.00 MF$0.65

THE "BLEACHING" EFFECT IN ZN S/ CO/ CRYSTALS UNDER THE INFLUENCE OF EXTREMELY LARGE PULSES OF A RUBY LASER.
National Aeronautics and Space Administration, Washington, D. C.
For primary bibliographic entry see Field 20L.
For abstract, see STAR 05 11.
N67-22838 HC$3.00 MF$0.65

LASER ASSISTED ROCK FRACTURE.
Massachusetts Inst. of Tech., Cambridge. Dept. of Civil Engineering.
For primary bibliographic entry see Field 13B.
PB-174 245 HC$3.00 MF$0.65

20F. OPTICS

GENERAL RESEARCH IN DIFFRACTION THEORY, VOLUME I,
Lockheed Missiles and Space Co., Sunnyvale, Calif.
Nelson A. Logan. Dec 59, 366p LMSD-288087-Vol-I
See also AD-243 182, Vol. 2.

Descriptors: (*Diffraction, Theory), Integrals, Optics, Mathematical models, Series, Functions, Electromagnetic waves, Scattering.

Two of the most difficult problems in applied electromagnetics are those of predicting the scattering charateristics of the convex metallic surfaces of radar targets and of predicting the radiation properties of antennas mounted on, or near, such surfaces. A report is made of the development of numerical methods for the computation of these diffraction phenomena. With the aid of tables of certain new fundamental function, the solution of many of these problems can be treated by a ray-tracing procedure which is a logical extension of classical geometrical and physical optics. This report is the first of a series of reports on the theory and applications of these functions. The volume is primarily concerned with the development of the mathematical tools to be employed in the applications which will be discussed in later volumes. Emphasis is placed upon the definition of, and derivation of properties of, a class of diffraction integrals which are related to solutions of the parabolic partial differential equation U sub yy plus or minus iU sub x + yU = 0. The recent work of the Soviet physicist V. A. Fock, the earlier work of van der Pol and Bremmer, and a number of other classic results in diffraction theory are shown to be special cases of the general theory which is developed. (Author)
AD-241 228 HC$3.00

OPTICAL CONSTANTS OF GERMANIUM,
Michigan Univ., Ann Arbor. Inst. of Science and Technology.
W. L. Wolfe, J. A. Jenny, W. C. Levengood, T. Limperis, and D. M. Szeles. Mar 64, 37p Rept. no. 5557-4-F
Contract Cwb-10533

Descriptors: (*Germanium, *Refractive index), Measurement, Temperature, Pressure, Radiometers, Wave transmission, Reflection, Absorption, Bibliographies.

An analysis has been made of the effects of change of refractive index of germanium on radiometric calibration; this analysis shows that the index cannot change by more than 0.01 if 2% accuracy is to be maintained--unless calibration procedures are used to account for this change. Several methods of measuring index have been investigated; as a necessary preliminary, the effects of changes in temperature and pressure on index were evaluated. For the usual atmospheric conditions, variations of 50 C or 50 torr will cause changes of no more than plus or minus 0.00001 of the refractive index of air. If temperature or pressure measurements can have errors as large as 50 C or 50 torr, then the error or uncertainty in index can be as large as 0.00001. Similarly, the sample must be measured to plus or minus 0.4 C. Each of nine possible techniques has been analyzed in terms of the precision necessary in the measurement of each of the independent variables. Deviation techniques are discussed in Section 3.1, reflection techniques in Section 3.2, interferometric methods in Section 3.3, and a sphere method in Section 3.4. The required measurement accuracies are summarized in Table I. Transmission measurements made on a sample submitted by the sponsor are also described and analyzed. (Author)
AD-435 012 HC$3.00

REMOTE SENSING OF ENVIRONMENT.
Michigan Univ Ann Arbor Inst of Science and Technology
For primary bibliographic entry see Field 22B.
AD-650 581 HC$3.00 MF$0.65

THE COMPLETE RAYLEIGH-SCATTERED FIELD WITHIN A HOMOGENEOUS PLANE-PARALLEL ATMOSPHERE.
Revised ed.,
Rand Corp Santa Monica Calif
T. W. Mulikin. 11 Feb 66, 47p Rept no. P-3493.
Contract AF 49 (638)-1700
Research supported in part by NASA. Prepared in cooperation with Purdue Univ., Lafayette, Ind. Div. of Mathematical Sciences. Revision of manuscript received 2 Sep 65.
Availability: Published in The Astrophysical Journal v145 n3 p886-931 Sep 1966.

Descriptors: (*Rayleigh scattering, Integral transforms), (*Light transmission, Computer programs), Atmosphere models, Polarization, Invariance, Reflection, Functions.

A direct numerical solution of the equation of radiative transfer in any particular model atmosphere is a rather lengthy task. This is particularly true if polarization is accounted for in a relatively thick atmosphere. The work of Ambartsumian and of Chandrasekhar shows that it is not necessary to solve the transfer equation completely if one is interested only in steady-state intensities of radiation on the bounding faces of a plane-parallel atmosphere. By heuristic principles of invariance they derived various non-linear equations which these special values of the intensity must satisfy. For a homogeneous atmosphere these equations can be considerably simplified, so that, even for the Rayleigh polarization scattering model, Chandrasekhar shows that reflection and transmission functions are simply expressed in terms of certain scalar functions, the X- and Y-functions. This paper extends our previous work on scalar transfer equations to the Rayleigh polarization equations in a homogeneous atmosphere. It shows that Chandrasekhar's results for scattering and reflection functions are merely the specialization to the boundary of formulae which hold within an atmosphere. This expresses the solution to this problem at any optical depth in an atmosphere of any optical thickness in terms of scalar functions for which there already exists an efficient and accurate computer program. It also obtains from this solution various asymptotic formulae of a relatively simple form.
AD-650 652 Not available from CFSTI.

EXPERIMENTAL TECNNIQUES FOR MEASURING VIBRATIONS USING A LASER INTERFEROMETER.
Technical memo.,
Navy Marine Engineering Lab Annapolis Md
R. A. Darby. Mar 67, 54p Rept no. MEL-TM-9/67

Descriptors: (*Vibration, Measurement), (*Interferometers, Gas lasers), Test methods, Accelerometers.

Existing and some apparently novel experimental techniques for measuring vibrations by use of a HeNe gas laser interferometer are evaluated. Schemes for obtaining accurate, absolute measurements of displacements less than 100 A, such as used in calibrating accelerometers, are considered as well as are methods of scanning a vibrating surface in order to obtain its dynamic displacement profile, as is often desired in acoustic radiation studies. The effect of intensity fluctuations of the light source, variations of the medium in the optical paths, background vibrational noise, and other phenomena are evaluated by comparison of the theory with measurements made on both a vibrating elastic plate and a vibration shake table. It is shown that experimental measurements at low displacements (<<1938 A) can be compared with theory without resorting to statistical evaluations of instrument error and undesired time-variant parameters. (Author)
AD-650 720 HC$3.00 MF$0.65

NUCLEAR MAGNETIC RESONANCE SPECTROMETER.
Foreign Technology Div Wright-Patterson AFB Ohio
V. M. Mamaev. 23 Jan 67, 7p Rept no. FTD-HT-66-701
Spektrometr Yadernogo Magnitnogo Rezonansa, unedited rough draft trans. of Patent (USSR) 172 116, appl. 902446/26-25, 26 May 64.

Descriptors: (*Spectrometers, Nuclear magnetic resonance), USSR, Patents.

A nuclear magnetic resonance spectrometer with automatic tuning to the signal maximum is described. The spectrometer contains a polarizing magnet, a detector with a double section coil into which are placed two specimens, a common modulation coil, a modulation unit, a measuring unit, and a meter. To measure continuously the signal difference of the two specimens, the spectrometer contains at the location of the specimens two systems of shift coils which are connected through a control resistor and a measuring device to a dc source. (Author)
AD-650 744 HC$3.00 MF$0.65

EFFECTIVE MASS OF FREE CARRIERS IN SEMICONDUCTORS AS DETERMINED FROM INFRARED REFLECTIVITY MEASUREMENTS.
Naval Ordnance Lab White Oak Md
For primary bibliographic entry see Field 20L.
AD-650 867 HC$3.00 MF$0.65

BALLOON-BORNE GRATING SPECTROMETER.
Denver Univ Colo Dept of Physics
David G. Murcray, Frank H. Murcray, and Walter J. Williams. 11 Oct 66, 10p Rept no. Scientific-5 AFCRL-67-0211
Contract AF 19 (628)-5202, ARPA Order-363
Availability: Published in Applied Optics v6 n2 p191-6 Feb 1967.

Descriptors: (*Meteorological balloons, Instrumentation), (*Infrared spectroscopy, *Spectrometers), Atmosphere, Solar spectrum, Infrared detectors, Flight testing, Infrared scanning, Diffraction gratings, Test equipment (Electronics), Performance (Engineering).

A balloon-borne, 0.5-m, Czerny-Turner grating spectrometer has been designed and constructed at the University of Denver and has measured atmospheric transmittance in several spectral regions between 2 micron and 14 micron. These data have been obtained on a series of eleven balloon flights at three geographic locations over a period of thirty months. The solar pointing system, spectrometer optics, electronics and recording systems are described. The pre-flight performance of the spectrometer is discussed and sample data presented. (Author)
AD-650 968 Not available from CFSTI.

STIMULATION OF OPTICAL EMISSIONS IN ATMOSPHERIC GASES.
Utah State Univ Logan Electro-Dynamics Labs
For primary bibliographic entry see Field 7E.
AD-651 017 HC$3.00 MF$0.65

LIST OF TRANSLATIONS 1966: FOREIGN LITERATURE RELATING TO THE GEOPHYSICAL SCIENCES.
American Meteorological Society Boston Mass
For primary bibliographic entry see Field 4A.
AD-651 044 HC$3.00 MF$0.65

SYMPOSIUM ON INTERDISCIPLINARY ASPECTS OF RADIATIVE ENERGY TRANSFER.
Final rept., 15 Aug 65-31 Mar 67,
General Electric Co Philadelphia Pa Missile and Space Div
S. M. Scala, and R. N. Thomas. 1 Apr 67, 81p Rept no. 67SD5223
Contract Nonr-5035 (00)

Descriptors: (*Electromagnetic waves, Transport properties), (*Photons, Transport properties), Space environmental conditions, Planetary atmospheres, Aerodynamics, Atmosphere entry, Astrophysics, Oceanology, Plasma physics, Shock waves, Thermodynamics, Symposia.

Summaries are given of the papers presented at the symposium. The topics cover radiative energy transfer with respect to space and atmospheric physics, aerospace applications, stellar aerodynamics, oceanography, solid transparent media, plasma, shock waves.
AD-651 048 HC$3.00 MF$0.65

STUDY OF DETERMINE DESIGN CRITERIA FOR A STEREO FIBER OPTIC PERISCOPE FOR AIRCRAFT APPLICATION.
IIT Research Inst Chicago Ill
For primary bibliographic entry see Field 1C.
AD-651 060 HC$3.00 MF$0.65

THEORY OF PARTIAL COHERENCE: A REVIEW.
Interim Scientific rept.,
Illinois Univ Urbana Antenna Lab
D. S. Karjala, and R. Mittra. Feb 67, 50p Rept no. TR-11
AFCRL-67-0192
Contract AF 19 (628)-3819

Descriptors: (*Coherent radiation, Theory), Reviews, Optics, Wave functions.

The report reviews the subject of partial coherence, mainly with respect to the classical second-order theory. The primary sources on this subject are Born and Wolf (1964), Mandel and Wolf (1965) and Beran and Parrent (1964). The material contained in these references is used freely herein. (Author)
AD-651 068 HC$3.00 MF$0.65

A SIMPLE EPR SPECTROMETER.
Foreign Technology Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 7D.
AD-651 083 HC$3.00 MF$0.65

OPACITY OF HOT, HIGHLY COMPRESSED HYDROGEN.
Naval Ordnance Lab White Oak Md
For primary bibliographic entry see Field 7D.
AD-651 203 HC$3.00 MF$0.65

LASER DAMAGE: A SELECTED LITERATURE SURVEY.
Air Force Cambridge Research Labs L G Hanscom Field Mass
For primary bibliographic entry see Field 20E.
AD-651 210 HC$3.00 MF$0.65

INFRARED RADIATIVE HEAT TRANSFER IN NONGRAY GASES.
State Univ of New York Stony Brook Coll of Engineering
For primary bibliographic entry see Field 20M.
AD-651 218 HC$3.00 MF$0.65

BROADBAND LASER DIGITAL DEFLECTOR.
Army Electronics Command Fort Monmouth N J
For primary bibliographic entry see Field 20E.
AD-651 220 HC$3.00 MF$0.65

COLORS OF SIGNAL LIGHTS: THEIR SELECTION, DEFINITION, MEASUREMENT, PRODUCTION, AND USE.
National Bureau of Standards, Washington, D. C. Inst. for Basic Standards.
For primary bibliographic entry see Field 13B.
NBS-Mono-75 HC$0.40 MF$0.65

THERMAL RADIATION PROPERTY MEASUREMENT TECHNIQUES.
National Bureau of Standards, Washington, D. C. Inst. for Basic Standards.

For primary bibliographic entry see Field 14B.
NBS-TN-415 HC$0.50 MF$0.65

NEWLY IDENTIFIED LINES IN NE I ISOELECTRONIC SEQUENCES.
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
For primary bibliographic entry see Field 7D.
For abstract, see STAR 05 11.
N67-22080 HC$3.00 MF$0.65

A METHOD TO CORRECT THE CALIBRATION SHIFT OBSERVED IN A NIMBUS MEDIUM RESOLUTION INFRARED RADIOMETER ON THE NASA CONVAIR 990 AIRCRAFT.
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
B. Sparkman. Feb 67, 44p NASA-TM-X-55741, X-622-67-37

Descriptors: *Calibration, *Convair cv-990 aircraft, *Infrared instrument, *Radiometer, Correction, Cv-990 aircraft, Equation, Infrared, Instrument, Medium, Method, Nimbus, Resolution, Shift.

For abstract, see STAR 05 11.
N67-22874 HC$3.00 MF$0.65

FEASIBILITY STUDY OF A METEOROID COMPOSITION ANALYZER SPECTROGRAPHIC SYSTEM FINAL REPORT.
Avco Corp., Wilmington, Mass. Research and Technology Labs.
3 Nov 66, 154p NASA-CR-65607, AVSSD-0219-66-RR
Contract NAS9-5267

Descriptors: *Meteoritic composition, *Micrometeoroid, *Particle motion, *Spectral analysis, Analysis, Argon, Ballistics, Composition, Emission, Experiment, Heating, Miniature, Motion, Particle, Range, Spectral, System, Xenon.

For abstract, see STAR 05 11.
N67-23325 HC$3.00 MF$0.65

REPORT OF NRL PROGRESS.
Naval Research Lab., Washington, D. C.
For primary bibliographic entry see Field 14B.
PB-174 485 HC$3.00 MF$0.65

DESIGN STUDY FOR AN IMPROVED SATELLITE INFRARED SPECTROMETER.
Final rept.,
Philips Labs., Briarcliff Manor, N. Y.
M. G. Dreyfus, G. K. Pitcher, and R. Williams.
1967, 115p TR-205, PL-19-W66-1207
Contract Cwb-11371

Descriptors: (*Infrared spectroscopy, *Satellites (Artificial)), Spectrometers, Design, Infrared scanning, Amplifiers, Infrared filters, Demodulators, Mirrors, Monochromators, Weight, Atmosphere, Humidity, Band spectrum.

The objective of this program was a design study for improving the Government's Satellite Infrared Spectrometer (SIRS). The improvements investigated were: reduction in weight and size; provisions for remote sensing of atmospheric humidity distribution; and improved geographic coverage of scan. The SIRS III infrared spectrometer determines atmospheric temperature versus altitude from a balloon (Ref. 1) or Earth satellite by measuring the upwelling infrared flux in eight spectral bandpasses centered at the following wavelengths. (Author)
PB-174 519 HC$3.00 MF$0.65

20G. PARTICLE ACCELERATORS

ENERGY-ANALYZING SYSTEM FOR THE ARGONNE 60-INCH CYCLOTRON,
Argonne National Lab., Ill.
W. J. Ramler, J. J. Livingood, and G. W. Parker.
Oct 66, 58p
Contract W-31-109-eng-38

Descriptors: (*Cyclotrons, Ion beams), (*Particle accelerators, Magnets), Power supplies, Focusing, Scattering.

For abstract, see NSA 21 09.
ANL-7251 HC$3.00 MF$0.65

INTERNATIONAL SYMPOSIUM OF ELECTRON AND POSITRON STORAGE RINGS, PART I.
Comitato Nazionale Per L Energia Nucleare, Frascati (Italy).
15 Nov 66, 24p LNF-66/55
Symp. Held At Saclay, France, Sep. 1966 Its Nota Interna No. 336

Descriptors: *Conference, *Electron beam, *Positron, *Storage device, Beam, Device, Electron, Injection, International, Magnet, Optics, Radio frequency, Relativity, Ring, Scattering, Storage, Vacuum.

For abstract, see STAR 05 11.
N67-22898 HC$3.00 MF$0.65

NEUTRON CONDUCTORS - A REPORT ON THE CURRENT STATE OF DEVELOPMENT.
Neutronenleiter - Ein Bericht Ueber Den Derzeitigen Stand Der Entwicklung
Kernforschungsanlage, Juelich (West Germany). Technische Hochschule Munchen (West Germany). Institut Fuer Neutronen Physik.
B. Alefeld, J. Christ, D. Kukla, R. Scherm, and W. Schmatz. Aug 65, 54p JUL-294-NP
in German Prepared Jointly With Tech. Hochschule Munchen

Descriptors: *Cold neutron, *Curved beam, *Neutron beam, Beam, Cold, Conductor, Construction, Curve, Experiment, Measurement, Neutron, Optical, Source, Theory, Tube.

For abstract, see STAR 05 11.
N67-22934 HC$3.00 MF$0.65

THE MICROTRON - THEORY AND PRINCIPAL ELEMENTS OF THE PROJECT.
Il Microtrone - Theoria E Principali Elementi Di Progetto
Comitato Nazionale Per L Energia Nucleare, Frascati (Italy). Lab. Nazionali Di Frascati.
D. Senatra. 5 Oct 66, 81p LNF-66/45
in Italian Its Nota Interna No. 333

Descriptors: *Microtron, *Particle accelerator, Accelerator, Beam, Cavity resonator, Displacement, Edge, Electron, Equation, Focusing, Injection, Matrix analysis, Motion, Nuclear physics, Particle, Positron.

For abstract, see STAR 05 11.
N67-23016 HC$3.00 MF$0.65

ON THE SHIELDING FOR THE QUENCHING SHAFT OF THE FRASCATI LINAC.
Sulle Schermature Per I Pozzi Di Spegnimento Del Linac Di Frascati
Comitato Nazionale Per L Energia Nucleare, Frascati (Italy). Lab. Nazionali Di Frascati.
M. Ladu, M. Pelliccioni, and M. Roccella. 19 Sep 66, 10p LNF-66/44
in Italian Its Nota Interna No. 332

Descriptors: *Linear accelerator, *Radiation protection, Accelerator, Attenuation, Charged particle, Copper, Economy, Ground, Ion, Linear, Neutron, Plate, Protection, Radiation, Water.

For abstract, see STAR 05 11.
N67-23018 HC$3.00 MF$0.65

EXPERIMENTAL RESULTS OF THE STUDY OF NUCLEAR STRUCTURE BY MEANS OF PIONS.
Proposta Di Esperienza Per Lo Studio Della Struttura Nucleare Mediante Pioni
Comitato Nazionale Per L Energia Nucleare, Frascati (Italy).
C. Guaraldo, C. Mancini, P. Picozza, C. Schaerf, and R. Scrimaglio. 21 Nov 66, 10p LNF-66/57
in Italian Its Nota Interna No. 338

Descriptors: *Linear accelerator, *Nuclear structure, *Pion, Accelerator, Beam, Counting, Gamma, Incidence, Linear, Magnetostriction, Nuclear, Nuclear physics, Structure, Velocity.

For abstract, see STAR 05 11.
N67-23025 HC$3.00 MF$0.65

20H. PARTICLE PHYSICS

MOMENTUM TRANSFER AND INELASTIC COLLISION CROSS SECTIONS FOR ELECTRONS IN O2, CO AND CO2.
Westinghouse Research Labs Pittsburgh Pa Atomic and Molecular Sciences
For primary bibliographic entry see Field 7D.
AD-650 751 Not available from CFSTI.

VIOLATION OF CP INVARIANCE AND NON-LEPTONIC DECAYS,
Illinois Univ Urbana Dept of Physics 1422
K. Nishijima, and L. J. Swank. 1967, 13p
Contract N00014-67-A-0305-0005, Grant NSF-GP-6198

Descriptors: (*Decay schemes, Invariance), (*K mesons, Decay schemes), Interactions, S-matrix, Elementary particles, Mathematical models, Field theory, Pions.
Identifiers: CP invariance.

Since the experimental discovery of the decay mode neutral-K (L) to positive-pion + -negative-pion, a number of theoretical propositions has been made. A new scheme is proposed for non-leptonic decays on the basis of the assumption that both CP-conserving and violating non-leptonic decays should be ascribed to the same primary interaction.
AD-650 951 HC$3.00 MF$0.65

3He (3He,t)3p AT 44 MEV,
California Inst of Tech Pasadena
T. A. Tombrello, and R. J. Slobodrian. Mar 67, 10p
Contract Nonr-220 (47)
Prepared in cooperation with Lawrence Radiation Lab., Berkeley, Calif.

Descriptors: (*Helium, Decay schemes), (*Nuclear energy levels, *Protons), (*Tritons, Nuclear spectroscopy), Ion beams, Interactions, Excitation, Energy, Statistical distributions.

Triton spectra from the reaction 3He (3He,t)3p were measured at a bombarding energy of 44 MeV for laboratory angles between 6 and 25 degrees. These spectra are quite featureless and show no indication of either a 3p final state interaction or of a strong sequential decay mode. (Author)
AD-650 970 HC$3.00 MF$0.65

A REGGE-QUARK MODEL OF HADRON SCATTERING,

Illinois Univ Urbana Dept of Physics 1422
P. B. James, and R. K. Logan. 1967, 10p
Contract N00014-66-C-00010-A05

Descriptors: (*Nuclear scattering, Mathematical models), (*Elementary particles, Interactions), Nuclear cross sections, Regge poles, Nuclear spins, Particle trajectories, Pions, Protons, Antiprotons, K mesons, Neutrons.
Identifiers: Hadrons, Quarks.

One of the unique features of the quark model is that one obtains relationships between baryon-baryon cross sections and meson-baryon cross sections. A Regge quark model analysis was recently performed in which agreement between these relations and experiment was obtained only after a scale factor was introduced (N. Ahmadzadeh, Phys. Letters v22 p96 1966) in the N-N amplitude. It is now shown how this agreement may be obtained without introducing such a factor.
AD-651 038 HC$3.00 MF$0.65

NEUTRON SPECTRA FROM MONOENERGETIC PHOTONS ON BISMUTH.
Doctoral thesis,
Illinois Univ Urbana Dept of Physics 1422
A. O. Hanson, and D. C. Sutton. 1967, 50p
Contract Nonr-1834 (05)

Descriptors: (*Bismuth, *Photonuclear reactions), (*Neutrons, *Nuclear spectroscopy), Bremsstrahlung, Photons, Gamma-neutron reactions, Nuclear resonance, Electric moments, Fast neutrons, Thermal neutrons, Ground state, Nuclear energy levels, Dipole moments.

Spectra of photoneutrons from a Bi209 target were obtained in the electric dipole giant resonance region (12 MeV - 16 MeV). Gamma-ray energy resolution of 1.5% was attained using a bremsstrahlung monochromator; the neutron energies were measured with a time-of-flight technique with resolution which varied from 10% at 2 MeV to 15% at 6 MeV. About 88% of the neutrons emitted by 14-MeV gamma rays are statistical. The inferred level density of Bi208 near its ground state is not a simple function of excitation energy, but from 4 to 7 MeV it increases exponentially with energy; in that energy range the temperature is about 1 MeV. The non-statistical high-energy neutrons leave the Bi208 nucleus at the excitation energies at which the states are well represented as single-neutron holes in Bi209. These high-energy neutrons are intimately connected with the giant resonance. If the giant resonance is dominated by a single dipole state, the absolute width which characterizes the decay of the dipole state into the compound nucleus must increase by a factor of about 3 between 12 and 16 MeV. (Author)
AD-651 111 HC$3.00 MF$0.65

MAGNETIC RELAXATION IN CRYSTALS.
Final rept.,
Washington Univ Seattle
Edwin A. Uehling. Apr 67, 14p
AROD-3955:2-P
Grant DA-ARO (D)-31-124-G436

Descriptors: (*Relaxation time, Crystals), (*Ferromagnetic materials, Relaxation time), Nuclear spins, Magnetic resonance, Protons, Deuterons, Mechanical waves, Propagation, Ferroelectric crystals, Nickel, Aluminum, Chemical bonds, Band theory of solids, Cryogenics.

A primary objective of the studies was a better understanding of the hydrogen bond dynamics on which the spin relaxation so largely depended. The topics included are: (1) Intrabond motion in KH2PO4 type crystals, (2) Proton and deuteron spin relaxation in anti-ferroelectric NH4H2PO4, (3) Arsenic-proton cross-over relaxation in KH2AsO4, (4) Acoustic wave propagation at the Curie temperature in KH2PO4 type crystals, (5) Spin-diffusion relaxation, (6) Ferromagnetic resonance in bulk samples of supermalloy and nickel for various orientations of the magnetic field with respect to the surface of the sample, (7) Magnetoacoustic effects in Aluminum at high radio frequencies and at 4.2 K.
AD-651 133 HC$3.00 MF$0.65

RADIATION DAMAGE BY COMPTON SCATTERING IN GAMMA OR X RAY PUMPED OPTICAL MASERS,
Army Missile Command Redstone Arsenal Ala Physical Sciences Lab
For primary bibliographic entry see Field 20E.
AD-651 186 HC$3.00 MF$0.65

GAMMA-RAY TRANSMISSION THROUGH FINITE SLABS,
Rand Corp., Santa Monica, Calif.
For primary bibliographic entry see Field 18F.
AD-8200 HC$3.00

SNARG-1D A ONE-DIMENSIONAL, DISCRETE-THEORY PROGRAM FOR THE CDC-3600,
Argonne National Lab., Ill.
G. J. Duffy, H. Greenspan, and S. D. Sparck. Jun 66, 61p
Contract W-31-109-eng-38

Descriptors: (*Flow charting, *Integral equations), (*Mathematical models, Specifications), Programming languages, One-dimensional flow, Iterative methods, Convergence.

For abstract, see NSA 21 09.
ANL-7221 HC$3.00 MF$0.65

BUBBLE CHAMBERS, 1964-1966,
Argonne National Lab., Ill.
For primary bibliographic entry see Field 18D.
For abstract, see NSA 21 09.
ANL-7265 HC$3.00 MF$0.65

INVESTIGATION OF KILOVOLT ION SPUTTERING QUARTERLY PROGRESS REPORT, NOV. 1966 - JAN. 1967.
California Univ., Berkeley. Space Sciences Lab.
F. C. Hurlbut, J. Khan, N. T. Olson, T. H. Pigford, and H. P. Smith, Jr.. 31 Jan 67, 10p NASA-CR-72013 SER.NO.8 ISSUE 6
Contract NAS3-5743

Descriptors: *Particle charging, *Sputtering, *Surface interaction, Aluminum, Bombardment, Cesium, Copper, Density, Implantation, Interaction, Ion, Measurement, Mercury, Oxide, Oxygen, Particle, Proton, Source, Spectrum, Surface, Velocity.

For abstract, see STAR 05 11.
N67-22064 HC$3.00 MF$0.65

THE GEOMETRIC FIELDS ABSOLUTELY DETERMINED BY THE BETA-GAMMA COINCIDENCE METHOD.
Kernforschungsanlage, Juelich (West Germany). Zentrallabor Fuer Chemische Analyse.
For primary bibliographic entry see Field 18H.
For abstract, see STAR 05 11.
N67-22136 HC$3.00 MF$0.65

STUDY OF THE NUCLEAR COMPONENT OF PRIMARY COSMIC RAYS ABOARD AES " PROTON-2".
Izucheniye Yadernoy Komponenty Pervichnykh Kosmicheskikh Luchey Na Isz "proton 2"
Volt Technical Corp., Washington, D. C.
N. L. Grigorov, V. E. Nesterov, I. A. Savenko, and N. N. Volodichev. 21 Feb 67, 6p NASA-CR-83562, ST-CR-NP-10566
Contract NAS5-12487
Transl. Into English From Kosmich. Issled. (Moscow), V. 5, No. 1, 1967 P 115-118

Descriptors: *Cosmic ray, *Proton ii satellite, *Spectrometer, Component, Cosmic, Measurement, Nuclear, Nucleus, Orbit, Primary, Ray, Trajectory, U.S.S.R..

For abstract, see STAR 05 11.
N67-22293 HC$3.00 MF$0.65

ISOTOPIC SPIN ANALYSIS OF POSSIBLE CP VIOLATING EFFECTS IN K YIELD 3 PI.
Laboratoire de Physique Theorique Et des Hautes Energies, Orsay (France).
M. K. Gaillard. Jan 67, 17p TH-181

Descriptors: *Isotopic spin, *Parity, *Particle decay, Amplitude, Charge, Coefficient, Decay, Elementary, Interference, Isotope, Kaon, Particle, Pion, Spin, Transition.

For abstract, see STAR 05 11.
N67-22464 HC$3.00 MF$0.65

ON THE QUASISPIN FORMALISM.
Nihon Univ., Tokyo (Japan).
M. Ichimura. 1966, 79p NUP-66-16
Submitted for Publication

Descriptors: *Neutron, *Nucleon, *Proton, *Spin dynamics, *Theoretical physics, Correlation, Dynamics, Elementary, Matrix, Nuclear, Operator, Pair, Particle, Physics, Spin, Theoretical, Transition.

For abstract, see STAR 05 11.
N67-22480 HC$3.00 MF$0.65

THE UNITARY REPRESENTATIONS OF THE SIMILITUDE GROUP OF SPACE-TIME.
International Centre for Theoretical Physics, Trieste (Italy).
R. L. Ingraham. Feb 67, 34p IC/66/7
Refs Submitted for Publication

Descriptors: *Matrix algebra, *Similitude law, *Spin-orbit interaction, *Unitarity, *Wigner coefficient, Algebra, Elementary, Interaction, Law, Matrix, Operator, Orbit, Particle, Projection, Space, Spin, Structure, Symmetry, Time.

For abstract, see STAR 05 11.
N67-22481 HC$3.00 MF$0.65

SEPARABLE NON-LOCAL TWO-NUCLEON POTENTIAL FOR ODD-PARITY SPIN TRIPLET STATES.
International Centre for Theoretical Physics, Trieste (Italy).
J. H. Naqvi. Dec 65, 25p IC/66/121
Refs Submitted for Publication

Descriptors: *Nucleon potential, *Parity, *Spin-orbit interaction, *Triplet state, Calculus, Interaction, Local, Matrix, Model, Nuclear, Nucleon, Nucleon-nucleon, Orbit, Parameter, Phase, Potential, Separation, Spin, State, Structure, Tensor, Triplet, Two.

For abstract, see STAR 05 11.
N67-22484 HC$3.00 MF$0.65

RELATION BETWEEN PROTON-NUCLEUS AND PROTON- NUCLEON INTERACTION AT 20 GE V.
International Centre for Theoretical Physics, Trieste (Italy).
W. E. Frahn. Dec 66, 10p IC/66/120
Refs Submitted for Publication

Descriptors: *Nuclear scattering, *Nucleon, *Proton scattering, Amplitude, Approximation, Elastic, Elementary, Energy, Impulse, Interaction, Nuclear, Nucleus, Particle, Proton, Scattering.

For abstract, see STAR 05 11.
N67-22489 HC$3.00 MF$0.65

S U3 WIGNER COEFFICIENTS IN ANGULAR MOMENTUM SPACE.
International Centre for Theoretical Physics, Trieste (Italy).
M. Iosifescu, and F. Stancu. Dec 66, 19p IC/66/108
Refs Submitted for Publication

Descriptors: *Angular momentum, *Group theory, *Symmetry, *Unitarity, *Wigner coefficient, Angular, Decoupling, Function, Group, Momentum, Nuclear, Particle, Physics, State, Theoretical, Theory, Wave.

For abstract, see STAR 05 11.
N67-22501 HC$3.00 MF$0.65

INTERPRETATION OF (D, ALPHA) REACTIONS ON FLUORINE 19 AND NITROGEN 15.
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
J. R. Priest, and J. S. Vincent. Apr 67, 21p
NASA-TN-D-3813
Contract 129-02-04-06-22

Descriptors: *Angular distribution, *Fluorine, *Nitrogen 15, *Nuclear reaction, Alpha, Angular, Cross section, Deuteron, Differential, Distribution, Nuclear, Particle, Reaction.

For abstract, see STAR 05 11.
N67-22861 HC$3.00 MF$0.65

OBSERVATIONS OF NUCLEI HEAVIER THAN IRON IN THE PRIMARY COSMIC RADIATION.
Minnesota Univ., Minneapolis. School of Physics and Astronomy.
J. F. Ormes, T. Von Rosenvinge, and W. R. Webber. Jan 67, 9p NASA-CR-83419, CR-92
Grant NSG-281

Descriptors: *Cerenkov counter, *Heavy nucleus, *Primary cosmic radiation, *Scintillation counter, *Spectral energy distribution, Balloon, Charge, Cosmic, Counter, Distribution, Energy, Flight, Iron, Primary, Radiation, Scintillation, Spectral.

For abstract, see STAR 05 11.
N67-22876 HC$3.00 MF$0.65

WORK REPORT, 1965.
Royal Inst. of Tech., Stockholm (Sweden). Div. of Plasma Physics.
For primary bibliographic entry see Field 20I.
For abstract, see STAR 05 11.
N67-22920 HC$3.00 MF$0.65

AN ANALYSIS OF QUASI-FREE ELECTRON SCATTERING ON NUCLEI AND CALCULATION OF THE ENERGY SPECTRA AND ANGULAR CORRELATIONS OF THE C12/E,E'P/B11 REACTION USING THE DISTORTED-WAVE IMPULSE APPROXIMATION.
Istituto Superiore Di Sanita, Rome (Italy). Lab. Di Fisica.
C. C. Degliatti. 15 Nov 66, 43p ISS-66/44

Descriptors: *Angular correlation, *Electron scattering, *Energy spectrum, *Free electron, *Nuclear reaction, Angular, Approximation, Boron, Calculation, Carbon 12, Correlation, Electron, Elementary, Energy, Free, Function, Impulse, Model, Nuclear, Particle, Reaction, Scattering, Shell, Spectrum, Wave.

For abstract, see STAR 05 11.
N67-22927 HC$3.00 MF$0.65

BARYON-ANTIBARYON PAIR PRODUCTION IN A QUARK MODEL.
Laboratoire de Physique Theorique Et des Hautes Energies, Orsay (France). Faculte des Sciences.
S. Badier. Dec 66, 9p TH-178

Descriptors: *Baryon, *Pair production, *Quark, *Theoretical physics, Group theory, Interaction, Matrix algebra, Model, Nuclear, Octet, Pair, Particle, Particle collision, Physics, Production, Spin, Theoretical.

For abstract, see STAR 05 11.
N67-22938 HC$3.00 MF$0.65

PRODUCTION OF ETA AND THE DEPHASING ANALYSIS OF THE PI-NUCLEON DIFFUSION.
La Production de Eta Et les Analyses en Dephasage de La Diffusion Pi-nucleon
Laboratoire de Physique Theorique Et des Hautes Energies, Orsay (France). Faculte des Sciences.
G. Mennessier. Dec 66, 19p TH-177
in French

Descriptors: *Elastic scattering, *Particle production, *Scattering amplitude, Amplitude, Coupling, Elastic, Eta, Model, Nuclear, Nuclear scattering, Nucleon, Particle, Phase shift, Photoproduction, Physics, Pion, Production, Reaction, Resonance, Scattering, Scattering matrix.

For abstract, see STAR 05 11.
N67-22939 HC$3.00 MF$0.65

COMPUTER EXPERIMENTS WITH CHARGED PARTICLES, CHARGED FLUIDS AND PLASMAS - A CLASSIFICATION AND BIBLIOGRAPHY.
Nagoya Univ. (Japan). Research Information Center.
For primary bibliographic entry see Field 9B.
For abstract, see STAR 05 11.
N67-22943 HC$3.00 MF$0.65

LOW-ENERGY BEHAVIORS OF THE T EQUALS O, S-WAVE, PI - PI SCATTERING PHASE SHIFT AND A POSSIBLE SCALAR MESON NONET.
Tokyo Univ. (Japan). Inst. of Physics.
H. Yabuki. 1966, 14p

Descriptors: *Meson, *Nuclear physics, *Phase shift, *Pion, Elementary, Mechanics, Particle, Phase, Scalar, Scattering, Shift, Wave.

For abstract, see STAR 05 11.
N67-22951 HC$3.00 MF$0.65

TWO NUCLEONS EMISSION PROCESS IN CHI-MESONS ABSORPTION.
Kyoto Univ. (Japan). Research Inst. for Fundamental Physics.
I.-T. Cheon. Dec 66, 30p RIFP-59

Descriptors: *Absorption, *Meson, *Nuclear physics, *Nucleon, *Pion, Capture, Carbon 12, Elementary, Emission, Neutron, Nuclear, Nucleus, Particle, Physics, Proton.

For abstract, see STAR 05 11.
N67-22952 HC$3.00 MF$0.65

ON THE FUNDAMENTAL CONCEPTS IN THE THEORY OF ELEMENTARY PARTICLES. I - HISTORY OF THE TOMONAGA THEORY OF FIELDS.
Tokyo Univ. (Japan). Dept. of Physics.
For primary bibliographic entry see Field 20J.
For abstract, see STAR 05 11.
N67-22954 HC$3.00 MF$0.65

ON THE FUNDAMENTAL CONCEPTS IN THE THEORY OF ELEMENTARY PARTICLES. II - PRESENT PROBLEMS.
Tokyo Univ. (Japan). Dept. of Physics.
Y. Fujimoto, S. Furuichi, M. Nagasaki, S. Nakamura, and M. Taketani. 1966, 20p

Descriptors: *Elementary particle, *Nuclear physics, *Quark, Baryon, Boson, Charge, Elementary, Japan, Mass, Meson, Nuclear, Particle, Physics, Spin, Structure.

For abstract, see STAR 05 11.
N67-22956 HC$3.00 MF$0.65

RADIANT INTENSITY DETERMINATION OF PULSED PHOTON BEAMS BY PULSE-HEIGHT MEASUREMENTS.
Japan Atomic Energy Research Inst., Ibaraki.
M. Narita, H. Okada, Y. Ozawa, and H. Tanida.
Jan 66, 12p NSJ-TR-4, REV.
Submitted for Publication Revised

Descriptors: *Photon beam, *Pulse height, *Radiation intensity, Accelerator, Beam, Bremsstrahlung, Counter, Height, Intensity, Measurement, Modulation, Particle, Photon, Pulse, Radiation, Voltage, X-ray.

For abstract, see STAR 05 11.
N67-22973 HC$3.00 MF$0.65

HYPERON-NUCLEON INTERACTIONS AND ASSOCIATE PRODUCTION ON THE DEUTERON.
Laboratoire de Physique Theorique Et des Hautes Energies, Orsay (France).
F. M. Renard, and Y. Renard. Dec 66, 34p TH-175

Descriptors: *Nuclear interaction, *Particle production, Decomposition, Deuteron, Dynamics, Gamma, Hyperon, Interaction, Kaon, Meson, Nuclear, Nucleon, Partial, Particle, Pi, Production, Relativity, Wave.

For abstract, see STAR 05 11.
N67-22990 HC$3.00 MF$0.65

INTERPRETATION OF ETA YIELD 3 PI AND K YIELD 2 PI BY THE MESO-STRONG INTERACTIONS.
Tokyo Univ. (Japan). Dept. of Physics.
M. Igarashi, T. Inami, N. Murai, S. Nakamura, and S. Sato. 1966, 33p

Descriptors: *Nuclear interaction, *Particle decay, *Unified field theory, Baryon, Decay, Field, Forbidden, Hamiltonian, Interaction, Kaon, Meson, Mode, Nuclear, Particle, Pion, Symmetry, Theory, Unified.

For abstract, see STAR 05 11.
N67-22995 HC$3.00 MF$0.65

A MODEL FOR ELASTIC SCATTERING AT HIGH ENERGY AND LARGE MOMENTUM TRANSFER.
Laboratoire de Physique Theorique Et des Hautes Energies, Orsay (France).
A. P. Contogouris. Nov 66, 12p TH-174

Descriptors: *Mathematical model, *Proton scattering, *Proton-proton reaction, Elasticity, Elementary, Energy, High energy, Interaction, Large, Mathematics, Model, Momentum, Particle, Physics, Proton, Reaction, Scattering, Theoretical, Transfer.

For abstract, see STAR 05 11.
N67-23003 HC$3.00 MF$0.65

I EQUALS J EQUALS O DIPION STATE WITH A CDD POLE.

Tokyo Univ. (Japan). Inst. of Physics.
Y. Fujii. Jan 67, 13p

Descriptors: *Excited state, *Pion, *Scattering amplitude, *Theoretical physics, Amplitude, Analysis, Elementary, Group, Inverse, Meson, Nuclear, Particle, Physics, Pole, Scattering, State, Symmetry, Theoretical, Theory.

For abstract, see STAR 05 11.
N67-23005 HC$3.00 MF$0.65

ULTRAVIOLET CORRECTIONS FOR THE PROCESS E PLUS PLUS E MINUS YIELDS MU PLUS PLUS MU MINUS PLUS GAMMA AND THE VALIDITY LIMIT OF THE BLOCH- NORDSIECK METHOD.
Ie Correzioni Ultraviolette Per Il Processo Eplus Plus Eminus Yields Muplus Plus Muminus Plus Gamma E Il Limite Di Validita' Del Metodo Di Bloch-nordsieck
Comitato Nazionale Per L Energia Nucleare, Frascati (Italy).
G. Rossi. 7 Nov 66, 11p LNF-66/51
in Italian Its Nota Interna No. 334

Descriptors: *Nuclear reaction, *Ultraviolet radiation, Accuracy, Electron, Elementary particle, High energy, Mass, Meson, Method, Muon, Nuclear, Photon, Radiation, Reaction, Ultraviolet.

For abstract, see STAR 05 11.
N67-23022 HC$3.00 MF$0.65

A QUARK MODEL FOR PARITY VIOLATING NON LEPTONIC DECAYS.
Laboratoire de Physique Theorique Et des Hautes Energies, Orsay (France).
S. Badier. Jan 67, 7p TH-182

Descriptors: *Hyperon, *Kaon, *Mathematical model, *Particle decay, *Quark, *S-wave, Amplitude, Decay, Mathematics, Model, Parity, Particle, Physics, Pion, Theoretical, Violation.

For abstract, see STAR 05 11.
N67-23067 HC$3.00 MF$0.65

FINAL STATE LAMBDA-NEUTRON INTERACTIONS IN GAMMA PLUS D YIELDS K PLUS PLUS LAMBDA PLUS N.
Laboratoire de Physique Theorique Et des Hautes Energies, Orsay (France).
F. M. Renard, and Y. Renard. Dec 66, 13p TH-176

Descriptors: *Hyperon, *Neutron, *Nuclear interaction, *S-wave, Cross section, Deuteron, Final, Gamma, Interaction, Kaon, Lambda, Nuclear, Physics, Scattering, State, Theoretical.

For abstract, see STAR 05 11.
N67-23069 HC$3.00 MF$0.65

SOME RESULTS OF THE MONTE CARLO CALCULATION OF THE (E, EFTP) REACTION FOR INCIDENT ENERGIES BETWEEN 300 AND 600 ME V.
Istituto Superiore Di Sanita, Rome (Italy). Laboratori Di Fisica.
G. Farchi. 10 Oct 66, 45p ISS-66/37

Descriptors: *Computer program, *Monte carlo method, *Proton scattering, *Table, Accelerator, Computer, Cross section, Elastic, Electron, Nucleus, Program, Proton, Reaction, Scattering.

For abstract, see STAR 05 11.
N67-23084 HC$3.00 MF$0.65

METHODS TAKING ACCOUNT OF COULOMB SCATTERING AND BREMSSTRAHLUNG FOR BUBBLE CHAMBER TRACKS TREATMENT.
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Problems.
For primary bibliographic entry see Field 18D.
For abstract, see STAR 05 11.
N67-23214 HC$3.00 MF$0.65

CALCULATION OF CERTAIN CHARACTERISTICS OF EXTENDED AIR SHOWERS IN THE LOWER PART OF THE ATMOSPHERE FOR LARGE FLUCTUATIONS OF THE ELEMENTARY ACT.
Raschet Nekotorykh Kharakhteristik Shirokikh Atmosfernykh Livney V Nizhney Chasti Atmosfery Pri Bol'shikh Fluktuatsiyakh Elementarnogo Akta
Volt Technical Corp., Washington, D. C.
R. A. Nymmik, and V. A. Shestoperov. 21 Mar 67, 15p NASA-CR-83530, ST-AI-NP-10581
Contract NAS5-12487
Transl. Into English From Yadern. Fiz. (Moscow), V. 5, Issue 2, 1967 P 357-368

Descriptors: *Cosmic ray shower, *Inelasticity, *Nuclear interaction, Air, Atom, Calculation, Coefficient, Cosmic, Distribution, Electron, Energy, Extension, Flux, Interaction, Nuclear, Particle, Photon, Primary, Proton, Ray, Shower.

For abstract, see STAR 05 11.
N67-23256 HC$3.00 MF$0.65

MEASUREMENT OF THE ENERGY SPECTRUM OF PRIMARY COSMIC RAYS IN THE ENERGY REGION FROM 1010 - 1014 E V WITH THE HELP OF AES PROTON-1.
Izmereniye Energeticheskogo Spektra Pervichnykh Kosmicheskikh Luchey V Oblasti Energiy 1010 - 1014 Ev S Pomoshch'yu Isz Proton-1
Volt Technical Corp., Washington, D. C.
N. L. Grigorov, O. M. Kovrizhnykh, and V. E. Nesterov. 7 Mar 67, 5p NASA-CR-83531, ST-CR-10574
Contract NAS5-12487
Transl. Into English From Izv. Akad. Nauk Sssr, Ser. Fiz. (Moscow), V. 30, No. 11, 1966

Descriptors: *Energy spectrum, *Primary cosmic radiation, *Proton i satellite, *Radiation measurement, Calorimeter, Cosmic, Energy, Experiment, High energy, Intensity, Ionization, Measurement, Primary, Proton, Radiation, Range, Satellite, Spectrum.

For abstract, see STAR 05 11.
N67-23257 HC$3.00 MF$0.65

POSSIBILITY OF DETERMINATION OF RELATIVISTIC PROTONS' CONTENT IN SOME SOURCES OF SYNCHROTRON RADIATION.
Vozmozhnost' Opredeleniya Soderzhaniya Relyativistskikh Protonov I Elektronov V Nekotorykh Istochnikakh Sinkhrotronnogo Izlucheniya
Volt Technical Corp., Washington, D. C.
I. S. Shklovskiy. 21 Feb 67, 5p NASA-CR-83534, ST-IGA-PF-10565
Contract NAS5-12487
Transl. Into English From Astron. Tsirkular No. 364 of the Akad. Nauk Sssr, 29 Mar. 1966

Descriptors: *Radiation source, *Relativistic particle, *Synchrotron radiation, Astronomy, Content, Electron, Emission, Interaction, Metagalaxy, Particle, Photon, Proton, Radiation, Radio, Relativity, Source, Synchrotron, X-ray.

For abstract, see STAR 05 11.
N67-23260 HC$3.00 MF$0.65

COMPARISON OF GRYZINSKI AND BORN CROSS SECTIONS FOR THE METASTABLE 2S STATE OF ATOMIC HYDROGEN.
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
C. F. Monnin, and G. M. Prok. Apr 67, 34p NASA-TN-D-3838
Contract 129-01-05-09-22

Descriptors: *Atomic excitation, *Born approximation, *Electron scattering, *Hydrogen atom, *Ionization cross section, Approximation, Atom, Cross section, Distribution, Electron, Energy, Excitation, Hydrogen, Ionization, Nuclear, Physics, Scattering, Velocity.

For abstract, see STAR 05 11.
N67-23283 HC$3.00 MF$0.65

SUPERCONVERGENCE IN PION PHOTOPRODUCTION.
International Centre for Theoretical Physics, Trieste (Italy).
L. K. Pande. 9 Feb 67, 9p IC/67/6
Submitted for Publication

Descriptors: *Convergence, *Photoproduction, *Pion, Amplitude, Neutron, Nucleon, Proton, Relation, State.

For abstract, see STAR 05 11.
N67-23381 HC$3.00 MF$0.65

MATRIX ELEMENTS FOR IRREDUCIBLE REPRESENTATIONS OF THE U/6,6/ ALGEBRA IN HARMONIC FUNCTION SPACE.
International Centre for Theoretical Physics, Trieste (Italy).
A. Maduemezia. Nov 66, 30p IC/66/104
Submitted for Publication

Descriptors: *Harmonic function, *Hilbert space, *Matrix algebra, Algebra, Calculation, Differential, Element, Function, Generator, Group, Group theory, Harmonic, Matrix, Operator, Representation, Space, State, Theory.

For abstract, see STAR 05 11.
N67-23382 HC$3.00 MF$0.65

RELATION BETWEEN BARE AND PHYSICAL MASS OF VECTOR BOSONS IN A TWO-DIMENSIONAL FIELD THEORY.
International Centre for Theoretical Physics, Trieste (Italy).
P. L. Haberler. Dec 66, 9p IC/66/114
Submitted for Publication

Descriptors: *Field theory, *Vector, *Vector meson, Boson, Dimension, Fermion, Field, Interaction, Mass, Meson, One, Particle, Physical, Propagator, Relation, Space, Theory, Time, Two.

For abstract, see STAR 05 11.
N67-23385 HC$3.00 MF$0.65

STRESS TENSOR AND THE 2 PLUS MESONS.
International Centre for Theoretical Physics, Trieste (Italy).
R. Delbourgo, A. Salam, and J. Strathdee. Dec 66, 31p IC/66/115
Revised

Descriptors: *Particle theory, *Stress tensor, Algebra, Conservation, Current, Hypothesis, Low energy, Matrix, Meson, Momentum, Nucleon, Octet, Operator, Particle, Quark, Stress, Tensor, Theory.

For abstract, see STAR 05 11.
N67-23386 HC$3.00 MF$0.65

NUCLEAR MATRIX ELEMENTS OF FIRST FORBIDDEN BETA TRANSITIONS IN THE NILSSON MODEL.
International Centre for Theoretical Physics, Trieste (Italy).
D. Bogdan, and P. Lipnik. Nov 66, 40p IC/66/111
Submitted for Publication

Descriptors: *Forbidden transition, *Particle decay, *Rhenium, *Thulium, Beta, Decay, Forbidden, Isotope, Matrix, Model, Nuclear, Parameter, Particle, Transition.

For abstract, see STAR 05 11.
N67-23388 HC$3.00 MF$0.65

PERTURBATION OF RESONANCE STATES AND ENERGY SHIFT IN MIRROR NUCLEI.
International Centre for Theoretical Physics, Trieste (Italy).
J. Humblet, and G. Lebon. Nov 66, 22p IC/66/106
Submitted for Publication

Descriptors: *Perturbation theory, *Resonance charge exchange, *S-matrix, Charge, Energy, Exchange, Hamiltonian, Light, Matrix, Mirror, Nucleus, Perturbation, Resonance, Shift, State, Theory.

For abstract, see STAR 05 11.
N67-23389 HC$3.00 MF$0.65

POSSIBLE DEFORMED STATES IN 115 IN AND 117 IN.
Aktiebolaget Atomenergi, Stockholm (Sweden).
A. Backlin, B. Fogelberg, and S. G. Malmskog.
Jan 67, 40p AE-263

Descriptors: *Energy level, *Indium, Cadmium, Coincidence, Delay, Detector, Energy, Excitation, Gamma, Germanium, Half-life, Isotope, Level, Lithium, Measurement, Method, Parity, Radiation, Ray, Spectrum, Spin, Transition.

For abstract, see STAR 05 11.
N67-23390 HC$3.00 MF$0.65

THE LAMBDA-LAMBDA HYPERNUCLEUS LAMBDA-LAMBDA HE6.
International Centre for Theoretical Physics, Trieste (Italy).
S. Ali, and A. R. Bodmer. Dec 66, 39p IC/66/112
Sponsored in Part By Manchester Univ.

Descriptors: *Helium, *Hypernucleus, *Three-body problem, Beryllium 10, Binding, Body, Core, Coupling, Interaction, Isotope, Lambda, Meson, Model, Nucleus, Particle, Physics, Potential, Problem, Radioactivity, Radius, Three.

For abstract, see STAR 05 11.
N67-23393 HC$3.00 MF$0.65

DECAY PROPERTIES OF 147 ND.
Aktiebolaget Atomenergi, Stockholm (Sweden).
For primary bibliographic entry see Field 18H.
For abstract, see STAR 05 11.
N67-23396 HC$3.00 MF$0.65

DECAY OF THE 16.3 MIN 182 TA ISOMER.
Aktiebolaget Atomenergi, Studsvik (Sweden).
For primary bibliographic entry see Field 18H.
For abstract, see STAR 05 11.
N67-23397 HC$3.00 MF$0.65

ON RELATIONS BETWEEN TOTAL CROSS SECTIONS IN HIGH ENERGY.
Tokyo Univ. (Japan). Inst. of Physics.
H. Yabuki. 1967, 4p

Descriptors: *Quark, *Regge pole, *Scattering cross section, Algebra, Amplitude, Cross section, Equivalence, High energy, Invariance, Method, Model, Parameterization, Scattering, Spin, Symmetry, Total, Unitarity.

For abstract, see STAR 05 11.
N67-23467 HC$3.00 MF$0.65

REALISATION D'UN EMSEMBLE D'ANALYSE BIPARAMETRIQUE. APPLICATION A L'ETUDE DE LA DESINTEGRATION DU NIVEAU DE 16, 11 MeV DU 12C (Construction of a Biparametric Analysis System. Application to the Study of the Break-Up of the 16. 11 MeV Energy Level of 12C).
Commissariat a l'Energie Atomique, Grenoble (France). Centre d'Etudes Nucleaires.
For primary bibliographic entry see Field 18D.
PB-174 578 HC$3.00 MF$0.65

LOW-ENERGY ACCELERATED ION DEPOSITION,
Dow Chemical Co., Golden, Colo. Rocky Flats Div.
G. A. Baum. 6 Feb 67, 11p
Contract AT (29-1)-1106

Descriptors: (*Kinetic energy, *Sputtering), (*Ions, Deposition), Finishes + finishing, Acceleration.

For abstract, see NSA 21 09.
RFP-686 HC$3.00 MF$0.65

20I. PLASMA PHYSICS

DEVELOPMENT AND POSSIBLE APPLICATIONS OF PLASMA AND RELATED HIGH-TEMPERATURE GENERATING DEVICES.
Materials Advisory Board, NAS-NRC, Washington, D. C.
30 Aug 60, 235p MAB-167-M
Contract DA-36-039-sc-76436

Descriptors: (*Magnetohydrodynamics, *Plasma physics), Bibliographies, Generators, Photonuclear reactions.

The broad domain of plasma research and engineering extends far beyond the present frontiers of human knowledge. Within the last few years, the outlines of the technology of generating plasmas have been drawn, and workable designs of plasma generating devices have been developed. The operating parameters for these devices have been significantly expanded and their usefulness as tools for studying and using high temperature effects has been abundantly proved. They afford the only practical means of maintaining for long periods temperatures ranging from below 5000K to 50,000K. Heat transfer rates (Btu/sq in/sec.) of commercial plasma jets are six to eight times those of an oxygen-fed flame and the hot gas can be of almost any desired chemical composition. Other fluids or aspirated solids can be injected into the high velocity flame in order to either participate in controlled chemical reactions or merely be heated and redeposited as adherent protective coatings on solid surfaces. New and exciting opportunities for additional applications of plasma phenomena are currently indicated in the race for national security and economic advancement.
AD-242 334 HC$3.00

RESEARCH ON THEORY OF MAGNETOGASDYNAMICS.
Final scientific rept.,
Observatoire de Paris (France)
J. F. Denisse. 15 Dec 65, 113p
AFCRL-66-527
Contract AF 61 (052)-432

Descriptors: (*Magnetohydrodynamics, Theory), Plasma medium, Plasma oscillations, Pressure, Frequency, Cerenkov radiation, Damping, France.

The report includes a: Study of waves in plasma submitted to a general adiabatic condition with no restriction on the pressure tensor; critical study of the linear approximation of the Vlasov equation and of the Landau damping; and study of the Cerenkov radiation of a charge moving in a plasma, including frequency and angular spectra. (Author)
AD-650 579 HC$3.00 MF$0.65

KINETIC THEORY OF A SPHERICAL ELECTROSTATIC PROBE IN A STATIONARY PLASMA,
California Univ Berkeley
Y. S. Chou, L. Talbot, and D. R. Willis. 31 May 66, 18p
Sponsored by ARPA and AFOSR.
Availability: Published in Physics of Fluids v9 n11 p2150-67 Nov 1966.

Descriptors: (*Plasma medium, *Probes (Electromagnetic)), Electrostatics, Kinetic theory, Charged particles, Distribution functions, Particle trajectories, Interactions, Plasma sheath, Integral equations.
Identifiers: Plasma probes.

The spherical electrostatic probe in a weakly-ionized gas is analyzed on the basis of kinetic theory using a Krook-type model for the collision integral. The charged particle motions are analyzed in energy-angular momentum phase space, and formal integral solutions for the distribution functions are obtained. Moment equations based on the Lees method are derived, taking into account curvature of the particle paths, and sample solutions of these equations are presented. The results obtained agree well with the numerical analysis of Laframboise, in the collisionless limit. It is found that the effect of charged-neutral particle collisions is to extend the probe sheath farther into the plasma and reduce the electron and ion currents, as well as the departures from neutrality within the sheath. Fair agreement is obtained with a moment method based on straight-line trajectories for the charged particles. The continuum limit is not included in the computations. (Author)
AD-650 590 Not available from CFSTI.

SMALL HYDROMAGNETIC OSCILLATIONS OF A TWO-DIMENSIONAL CAVITY,
Queen Mary Coll London (England)
David N. Burghes. 1967, 32p Rept no. Scientific-7
AFCRL-67-0140
Grant AF-EOAR-74-64

Descriptors: (*Plasma oscillations, Mathematical models), Magnetohydrodynamics, Magnetic fields, Kinetic theory, Electrical conductance, Solar wind, Great Britain.

Two models are formulated. In the first, the cavity surrounds a finite number of line currents immersed in a fluid of infinite electrical conductivity. The fluid is free of magnetic field, and is at uniform pressure. The cavity in the second model is due to a finite number of line currents inside the cavity, and a uniform magnetic field outside. Material of infinite conductivity is trapped between the internal and external magnetic fields. Integral expressions for the magnetic potential energy are found when the system is subjected to a small general displacement. For the physical models formulated, the kinetic energy may be found, and Lagrange's equations can then be used to find the normal modes of oscillation. (Author)
AD-650 618 HC$3.00 MF$0.65

THE EFFECT OF TRANSVERSE ION CURRENT ON THE FLOW OF AIR IN A FLAT DUCT.
Technical rept.,
Ohio State Univ Research Foundation Columbus
E. Pejack, and H. Velkoff. Feb 67, 84p Rept no. TR-2
AROD-4942:2-E
Contract DA-31-124-ARO (D)-246

Descriptors: (*Gas flow, *Electrical corona), (*Ionic current, Gas flow), Magnetohydrodynamics, Ducts, Friction, Velocity, Pressure, One-dimensional flow.

Friction factors, velocity distributions, pressure gradients, and density measurements were made on a 5/8-inch x 5-inch rectangular flow channel with air flow. A plane of corona wires along the midplane of the channel was the source of ions which drifted across the air flow to the electrically grounded walls of the channel. Experimental data were collected to determine the influence of the ion flow on the air flow and the extent of the ion-fluid coupling. The electrodynamic and hydrodynamic equations were set up and several approximate solutions were obtained based on the postulation of a flow induced body force and the assumption of fully established, one-dimensional flow. The magnitude of the ion effects was found to be significantly dependent on the ion density distribution within the flow channel. (Author)
AD-650 639 HC$3.00 MF$0.65

DIRECT PROBE MEASUREMENTS IN THE AURORAL IONOSPHERE.
Final rept., 27 Mar 63-1 Aug 65,
Maryland Univ College Park Dept of Physics and Astronomy
Richard T. Bettinger, and Philip T. Huang. Sep 66, 38p
AFCRL-66-825
Contract AF 19 (628)-2792
See also AD-613 065.

Descriptors: (*Probes (Electromagnetic), *Ionosphere), (*Atmospheric sounding, *Radiation measurement systems), (*Sounding rockets, *Ionospheric propagation), Plasma physics, Flight testing, Instrumentation, Electron density, Charged particles, Aurorae, Ions, Density.

Analysis of vehicle potential measurements in a disturbed ionosphere has provided additional information on the rather difficult problem of plasma-vehicle interaction. The flight data from the Aerobee indicates that under certain conditions, there exists a rather strong correlation between vehicle potential and the ambient charge particle density. Minimum vehicle potentials (i.e., corrected for the induced effects from current collecting devices) exceeding 2 volts in the region of auroral activity suggests the presence of a high energy component in the electron energy distribution, > 1 eV. Although the vehicle sheath calculations were performed for ideal conditions, they nevertheless indicate that the presence of a high energy tail enhances the density dependence of the vehicle potential.
AD-650 644 HC$3.00 MF$0.65

INTERACTION OF MAGNETO-PLASMA WAVES IN A TWO COMPONENT SOLID STATE PLASMA.
Brown Univ Providence R I Dept of Physics
P. R. Beaudent, and A. Houghton. 17 Oct 66, 7p
AROD-6138:3
Contract DA-31-124-ARO (D)-445
Availability: Published in Physics Letters, v23 n11 p658-60, 12 Dec 1966.

Descriptors: (*Plasma medium, Solids), (*Magnetohydrodynamics, Interactions), Electromagnetic waves, Propagation, Field theory, Magnetic fields, Particles.
Identifiers: Alfven waves.

The selfsustained electromagnetic modes of compensated and uncompensated two component magneto-plasmas are studied using a local self-consistent field theory which includes collisions. It is shown that in the case of an uncompensated plasma (a deficiency of the heavier particle) the two modified Alfven modes of the system, one of which is helicon-like when q to 0, always interact and separate at finite angles of propagation to the d.c. magnetic field. (Author)
AD-650 708 Not available from CFSTI.

ELECTRON LOSS PROCESSES IN IONIZED GASES.
Technical rept.,
Pittsburgh Univ Pa Dept of Physics
M. A. Biondi. 1966, 8p Rept no. TR-5
Contract Nonr-624 (13)
Supported in part by ARO (D).
Availability: Published in Proceedings of the International Conference on Phenomena in Ionized Gases (7th) v1 p19-26 (Beograd 1966).

Descriptors: (*Plasma medium, *Electrons), (*Afterglows, Interactions), (*Recombination reactions, Plasma medium), Microwaves, Spectroscopy, Mass spectroscopy, Gas discharges, Gas ionization, Photochemistry, Nitrogen oxides, Dissociation, Probability, Atomic energy levels, Neon, Ionization potentials.

Some recent 'Swarm Experiments' involving afterglow studies of atomic collisions in ionized gases are discussed. A description is given of the appropriate microwave, optical interferometric and mass spectrometric afterglow techniques used to study ambipolar diffusion, electron attachment, electron-ion recombination, and Penning ionization processes. In the afterglow of a photoionized nitric oxide plasma at 300K electrons are lost by ambipolar diffusion and threebody attachment with coefficients D (a)p = 145 plus or minus 10 sq cm/sec Torr and K = (3 plus or minus 0.5) x 10 to the -31 power cm to the 6th power/sec, respectively. Microwave and mass spectrometric studies of nitrogen-neon afterglows indicate that the dissociative recombination coefficient for N2 (+) ions and electrons at 300K is a (N2 (+)) = (2.9 plus or minus 0.3) x 0.0000001 cu cm/sec, while the Penning ionization cross section for nitrogen molecules by thermal neon metastable atoms is Qi approx. = 5 x 10 to the -16 power sq. cm. Optical interferometric studies of the spectral line shapes of recombination radiation from neon afterglows show that the excited atoms have dissociation kinetic energies consistent with the dissociative recombination reaction, Ne2 (+) + e= (Ne2*) unstable = Ne* + Ne + kinetic energy. From these studies it is found that the binding energy of the Ne2 (+) ion involved in the recombination reaction is approximately 1.4 eV. (Author)
AD-650 772 Not available from CFSTI.

LABORATORY MEASUREMENTS OF ELECTRON-ION RECOMBINATION COEFFICIENTS.
Technical rept.,
Pittsburgh Univ Pa Dept of Physics
M. A. Biondi. 1967, 12p Rept no. TR-6
Contract Nonr-624 (13)
Supported in part by ARO (D).
Availability: Published in Space Research VII-North-Holland Publishing Co., Amsterdam p154-164.

Descriptors: (*Plasma medium, *Recombination reactions), (*Afterglows, Recombination reactions), Electrons, Ions, Dissociation, Reaction kinetics, Gas discharges, Gas ionization, Oxygen, Nitrogen, Nitrogen oxides, Electron density, Microwaves, Spectroscopy, Mass spectroscopy, Ionosphere, Molecular energy levels.

Experimental methods are described by which (a) it is established that two-body dissociative recombination of electrons and ions is the process under study in the laboratory, (b) the recombination rate coefficients are determined and (c) a measured recombination coefficient is assigned to a particular ionic species (e.g. O2 (+) or N2 (+). Various afterglow apparatus are employed, such as microwave apparatus to measure the electron density decay, differentially pumped mass spectrometers to identify the ions undergoing recombination in the plasma-afterglow, and optical spectrometers and interferometers to monitor the recombination radiation and to determine the kinetic energy of the excited atoms produced by recombination. The measurements of the recombination coefficients of N2 (+), NO (+), and O2 (+) ions with electrons are described and the possible errors in the laboratory determinations are assessed. It is concluded that uncertainties in the laboratory values are probably less than 30%. Therefore, in order to remove apparent discrepancies between laboratory measurements and some ionospheric analyses one must question whether the particular electronic and vibrational states of the molecular ions, or even the ionic species, correspond in the two cases. (Author)
AD-650 773 Not available from CFSTI.

THE INFLUENCE OF HALL EFFECT AND INITIAL VELOCITY PROFILE ON MHD FLOW IN THE ENTRANCE REGION OF A PARALLEL PLATE CHANNEL.
Tennessee Univ Tullahoma Space Inst 4304
William T. Snyder, and Arsev H. Erasian. Apr 67, 103p
AEDC-TR-67-79
Contract AF 40 (600)-1113

Descriptors: (*Magnetohydrodynamics, *Hall effect), (*Incompressible flow, Equations of motion), Potassium compounds, Chlorides, Magnetic fields, Velocity, Density, Conductivity.

A new method is presented for the analysis of MHD flow in the entrance region of a parallel plate channel including the Hall effect. The method involves a linearization of the inertia terms and the introduction of a stretched axial coordinate. A solution is obtained for the velocity distribution in an incompressible fluid which is valid from the duct inlet to the fully developed region. In practice, flows in which the Hall effect is significant will be compressible. Since the primary objective of the present analysis is to develop the analytical technique for extending the linearization scheme to MHD flows with Hall effect, the constant density assumption is justifiable as a first approximation. From this solution numerical results are obtained for the entrance length, pressure distribution, boundary layer thickness, and wall shear stress distribution in the entrance region for various values of the Hartmann number and the Hall parameter.
AD-650 820 HC$3.00 MF$0.65

NONEQUILIBRIUM STRUCTURE OF HYDROMAGNETIC GAS-IONIZATING SHOCK FRONTS IN ARGON,
Polytechnic Inst of Brooklyn N Y Dept of Aerospace Engineering and Applied Mechanics
Martin I. Hoffert. Feb 67, 63p Rept no. PIBAL-1008
Contract Nonr-839 (38), ARPA Order-529

Descriptors: (*Magnetohydrodynamics, *Shock waves), Gas ionization, Magnetic fields, Nonequilibrium flow, Relaxation time, Mathematical analysis, Argon, Temperature.
Identifiers: Defender project.

A 'low temperature' collisionally-ionizing shock with oblique magnetic field is studied to determine whether certain concepts which exist in the current literature are relevant. Nondimensionalized equations governing the nonequilibrium structure of such a front propagating into un-ionized argon are formulated using ionization rates and an electron energy equation. Comparison of the magnitudes of viscous and magnetic Reynolds numbers within this front indicates that, if a structure exists, it must consist of a narrow 'imbedded' viscous shock standing upstream of a much wider hydromagnetic interaction and ionization relaxation zone. Hence, a modified form of the Zeldovich-von Neumann-Doring (ZND) approximation is applicable to the structure problem. It is shown that in this approximation nontrival steady-state structures cannot be constructed for 'fast' gas-ion-

izing shocks. On the other hand, solutions are possible for 'slow' waves. (Author)
AD-650 828 HC$3.00 MF$0.65

INSTRUMENTATION DEVELOPMENT PROGRAM.
Arnold Engineering Development Center Arnold Air Force Station Tenn
For primary bibliographic entry see Field 21C.
AD-650 857 HC$3.00 MF$0.65

FULLY DEVELOPED MAGNETOGASDYNAMIC FLOW BETWEEN DIVERGING PLANE WALLS.
Final rept.,
Tennessee Univ Tullahoma Space Inst 4304
William T. Snyder, and James R. Maus. Apr 67, 123p
AEDC-TR-67-80
Contract AF 40 (600)-1113

Descriptors: (*Magnetohydrodynamics, Equations of motion), Walls, Compressible flow, Viscosity, Thermal conductivity, Mathematical models, Velocity, Hall effect.

A solution was obtained to the magnetogasdynamic equations of motion including the effects of compressibility, viscosity, thermal conductivity and crossed electric and magnetic fields. The solution obtained is valid for an acceleration flow in which a separation of variable form of solution is utilized. The constraints under which a separable solution is valid are clearly delineated. The solution is an exact solution in the sense that no terms were dropped from the governing equations and boundary layer approximations were not employed. The results of the investigation were presented in the form of velocity and temperature profiles for several values of the electromagnetic parameters Ha and phi. Although the mathematical model used in the present investigation is too crude to be utilized for detailed design of a practical MHD accelerator, it is believed, nervertheless, that the model displays certain qualitative features of the flow which are likely to be encountered in a practical device. (Author)
AD-651 034 HC$3.00 MF$0.65

SYMPOSIUM ON INTERDISCIPLINARY ASPECTS OF RADIATIVE ENERGY TRANSFER.
General Electric Co Philadelphia Pa Missile and Space Div
For primary bibliographic entry see Field 20F.
AD-651 048 HC$3.00 MF$0.65

CALCULATIONS USEFUL IN THE DETERMINATION OF ELECTRON TEMPERATURE FROM X-RAY CONTINUUM RADIATION EMITTED FROM HIGH TEMPERATURE PLASMAS,
Naval Research Lab Washington D C
Raymond C. Elton, and Arlo D. Anderson. 31 Mar 67, 42p Rept no. NRL-6541

Descriptors: (*Plasma medium, *Bremsstrahlung), (*X-ray spectroscopy, Foils), (*Electrons, Energy), Beryllium, Aluminum, Nickel, Polyethylene plastics, X-ray absorption analysis, Test methods.
Identifiers: Electron temperature.

The results of calculations of the total integrated bremsstrahlung radiation passing through absorbing foils of beryllium, aluminum, and nickel (as well as aluminum and nickel in combination with carbon (polyethylene)) are presented for various temperatures and a range of useful thicknesses. Such information is necessary in obtaining values for the electron temperature in a plasma from measurements of the soft x-ray continuum emission. The spectral distribution of the transmitted radiation is also presented for use in determining the spectral region observed, thereby avoiding regions of undesirable radiation. An indication of an observable flux level in a typical experiment is given, along with equations suitable for scaling to other plasma conditions, as a further aid in selecting foils for a particular application. (Author)
AD-651 050 HC$3.00 MF$0.65

RESEARCH ON NON-EQUILIBRIUM STATISTICAL PHYSICS.
Brussels Univ (Belgium) Faculte des Sciences
For primary bibliographic entry see Field 20M.
AD-651 069 HC$3.00 MF$0.65

CONFINEMENT OF PLASMA IN A TRAP WITH A COMBINED MAGNETIC FIELD,
Foreign Technology Div Wright-Patterson AFB Ohio
M. S. Ioffe, and R. I. Sobolev. 17 Mar 67, 24p
Rept no. FTD-MT-65-305
TT-67-61679
Uderzmanie Plazmy v Lovusnke s Kobinirovannym Magnitnym Polem, edited machine trans. of Atomnaya Energiya (USSR) v17 n5 p366-75 1964.

Descriptors: (*Magnetic pinch, Plasma medium), (*Plasma medium, Confinement), Magnetic fields, Stability, Magnetohydrodynamics, Plasma oscillations, Relaxation time, USSR.

The confining properties of an adiabatic trap with a magnetic field increasing in the longitudinal and radial directions are investigated. Such a field is obtained from the combination of a field of the usual mirror configuration and a field of a system of conductors with current, located in parallel to the axis of the trap. On the basis of the results it is concluded that such a field ensures stable confinement of a plasma, not disturbed by magnetohydrodynamic instability. The decay of the plasma is determined by the charge exchange of fast ions on the residual gas; at most the attained times of retention comprise 0.06 sec at p = 7 times 10 to the -9th power mm Hg. A qualitative picture of the distribution of the density of the plasma over the radius of the trap is obtained. (Author)
AD-651 089 HC$3.00 MF$0.65

MODE SYNCHRONIZATION PHENOMENA IN UNIVERSAL PLASMA INSTABILITIES.
Technical note,
Maryland Univ College Park Inst for Fluid Dynamics and Applied Mathematics
Herbert Lashinsky. Jan 67, 18p Rept no. BN-487
AFOSR-67-0895
Contract AT (40-1)-3405, Grant AF-AFOSR-1016-67

Descriptors: (*Plasma oscillations, *Turbulence), Mathematical models, Fluid flow, Nonlinear systems.

A nonlinear mechanism is indicated by which discrete modes in a bounded unstable plasma can give rise to a quasi-continuous turbulence spectrum. The transition from the discrete spectrum to the turbulence spectrum occurs at a critical value of the so-called locking parameter. A given mode is frequency-modulated by a 'periodic pulling' effect when the mode is at the threshold for locking onto a perturbation whose frequency is close to the unperturbed mode frequency. In the present case the perturbation derives from harmonics of lower frequency modes. The broad spectrum associated with the frequency modulated mode provides an effective means for taking the energy contained in the discrete mode and distributing it over a large number of sidebands arranged asymmetrically around the original mode frequency. (Author)
AD-651 092 HC$3.00 MF$0.65

WEAK TURBULENCE IN A HOMOGENEOUS PLASMA,
Princeton Univ., N. J. Plasma Physics Lab.
For primary bibliographic entry see Field 18A.
For abstract, see NSA 21 09.
MATT-496 HC$3.00 MF$0.65

PLASMA PHYSICS AND CONTROLLED THERMONUCLEAR FUSION.
Israel Program for Scientific Translations, Ltd., Jerusalem.
K. D. Sinelnikov. 1966, 598p
Transl. Into English of the Book "fizika Plazmy-Problemy Upravlyaemogo Termoyadernogo Sinteza" Kiev, Akad. Nauk Ukr. Ssr., Fiz.-tekhn. Inst., N. 4, 1965 Proceedings of the 4th Conf. on Plasma Phys. and Controlled Thermonucl. Fusion, Kharkov, May 1963 Published for Nasa and Nsf

Descriptors: *Conference, *Magnetic field, *Magnetic trap, *Magnetohydrodynamic generator, *Microwave plasma probe, *Plasma probe, *Plasma-electromagnetic interaction, *Plasmoid, *Theoretical physics, *Vacuum system, Beam, Cathode, Coil, Density, Discharge, Electromagnetic, Electron, Experiment, Field, Gas, Generator, Gun, High frequency, Interaction, Ion, Low temperature, Magnetic, Magnetohydrodynamic, Metal, Microwave, Physics, Plasma, Probe, Study, System, Theoretical, Trap, U.S.S.R., Vacuum, Winding.

For abstract, see STAR 05 11.
N67-21881 HC$3.00 MF$0.65

VIBRATIONAL DISSOCIATION AND CASCADE DISSOCIATION OF H2+ IONS BY COLLISION WITH MOLECULES OF A GAS.
Commissariat A L Energie Atomique, Fontenay-Aux-roses (France).
For primary bibliographic entry see Field 7D.
For abstract, see STAR 05 11.
N67-22135 HC$3.00 MF$0.65

NUMERICAL TREATMENT OF NON-IDEAL MGD BASIC EQUATIONS.
Innsbruck Univ. (Austria). Inst. for Theoretical Physics.
H. Friedel. 15 Jun 66, 14p SR-33, AD-643163
Contract AF 61/052/-675

Descriptors: *Magnetogasdynamics, *Motion equation, *Numerical analysis, Analysis, Characteristic, Dimensional, Equation, Flow, Motion, Numerical, One, Theory, Vector.

For abstract, see STAR 05 11.
N67-22449 HC$3.00 MF$0.65

THE PROPAGATOR FOR DISTURBANCES IN A PLASMA.
Comitato Nazionale Per L Energia Nucleare, Frascati (Italy). Laboratorio Gas Ionizzati.
R. Nozawa. Oct 65, 36p LGI-65-27
Sponsored in Part By Euratom

Descriptors: *Electron plasma, *Plasma oscillation, *Propagation mode, Analysis, Dispersion, Electron, Fluid, Fourier transform, High frequency, Matrix, Method, Mode, Oscillation, Plasma, Propagation, Propagator, Wake.

For abstract, see STAR 05 11.
N67-22490 HC$3.00 MF$0.65

ON THE PARTICLE, MOMENTUM AND HEAT BALANCE OF A MAGNETIZED PLASMA.
Royal Inst. of Tech., Stockholm (Sweden). Dept. of Plasma Physics.
B. Lehnert. 4 Oct 66, 102p REPT.-66-17

Descriptors: *Heat balance, *Ionized gas, *Magnetic field, Balance, Boundary, Diffusion, Field, Gas, Heat, High density, Ionization, Ionized, Layer, Magnetic, Magnetization, Momentum, Neutral, Nonrotating, Partial, Particle, Plasma, Rotation.

For abstract, see STAR 05 11.
N67-22496 HC$3.00 MF$0.65

SEPARATION OF MATTER AND ANTIMATTER.
Royal Inst. of Tech., Stockholm (Sweden). Electron and Plasma Physics Div.
For primary bibliographic entry see Field 3B.
For abstract, see STAR 05 11.
N67-22498 HC$3.00 MF$0.65

RESEARCH LABORATORY OF ELECTRONICS QUARTERLY PROGRESS REPORT NO. 84.
Massachusetts Inst. of Tech., Cambridge. Research Lab. of Electronics.
G. G. Harvey, and H. J. Zimmermann. 15 Jan 67, 406p NASA-CR-83421
Grants NSG-496, NSG-22-009-/163/

Descriptors: *Communication theory, *Physics, *Plasma dynamics, Acoustics, Astronomy, Atom, Beam, Bibliography, Biophysics, Collision, Communication, Computer, Dynamics, Electrodynamics, Fusion, Geophysics, Gravity, Information, Language, Laser, Microwave, Molecular, Neurophysiology, Nuclear, Plasma, Processing, Radio, Resonance, Scattering, Spectroscopy, Speech, Surface, Theory, Ultrasonics.

For abstract, see STAR 05 11.
N67-22641 HC$3.00 MF$0.65

NINETEEN-SIXTY-SIX SESSION OF THE GODDARD SUMMER WORKSHOP FINAL REPORT.
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
For primary bibliographic entry see Field 4A.
For abstract, see STAR 05 11.
N67-22741 HC$3.00 MF$0.65

PLASMA STABILITY AND THE BOHR- VAN LEEUWEN THEOREM.
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
J. R. Roth. Apr 67, 54p NASA-TN-D-3880
Contract 129-02-03-05-22

Descriptors: *Collisionless plasma, *Magnetoplasma, *Plasma stability, Bohr-van leeuwen theorem, Characteristics, Collisionless, Confinement, Equation, Equilibrium, Field, Interior, Magnetic, Momentum, Plasma, Region, Stability.

For abstract, see STAR 05 11.
N67-22863 HC$3.00 MF$0.65

VELOCITY SPACE INSTABILITIES IN A TOROIDAL GEOMETRY.
International Centre for Theoretical Physics, Trieste (Italy).
H. L. Berk, and A. A. Galeev. Nov 66, 40p IC/66/91, REV.
Refs Sponsored in Part By the Aec

Descriptors: *Equilibrium flow, *Plasma instability, *Toroidal plasma, *Trapped particle, Analysis, Distribution, Equilibrium, Field, Flow, Fluid, Function, Geometry, Instability, Kinetic, Machine, Magnetic, Mirror, Model, Particle, Plasma, Space, Stability, Toroid, Trajectory, Trap, Velocity, Wall.

For abstract, see STAR 05 11.
N67-22905 HC$3.00 MF$0.65

WORK REPORT, 1965.
Verksamhetsrapport, 1965
Royal Inst. of Tech., Stockholm (Sweden). Div. of Plasma Physics.
1965, 22p REPT.-66-03
in Swedish, English Summary

Descriptors: *Plasma physics, *Research project, Accelerator, Arc, Circuit, Collisionless, Confinement, Cosmic, Cosmogony, Cosmology, Current, Dipole, Discharge, Electric, Electron, Field, Fusion, Gun, Interruption, Ionizing, Ionosphere, Magnetic, Magnetosphere, Mercury, Mirror, Physics, Plasma, Project, Radiation, Reaction, Research, Wave.

For abstract, see STAR 05 11.
N67-22920 HC$3.00 MF$0.65

MAGNETOHYDRODYNAMIC TRANSPIRATION COOLING.
National Aeronautical Lab., Bangalore (India).
For primary bibliographic entry see Field 1A.
For abstract, see STAR 05 11.
N67-22937 HC$3.00 MF$0.65

COMPUTER EXPERIMENTS WITH CHARGED PARTICLES, CHARGED FLUIDS AND PLASMAS - A CLASSIFICATION AND BIBLIOGRAPHY.
Nagoya Univ. (Japan). Research Information Center.
For primary bibliographic entry see Field 9B.
For abstract, see STAR 05 11.
N67-22943 HC$3.00 MF$0.65

PLASMA COMPUTER EXPERIMENTS IN THREE DIMENSIONS - DEVELOPMENT OF A CODE FOR GUIDING CENTER FLUIDS.
Nagoya Univ. (Japan). Research Information Center.
C. K. Birdsall, and T. Kamimura. Dec 66, 51p IPPJ-55
Sponsored By Nsf

Descriptors: *Computer program, *Experiment design, *Plasma physics, *Three-dimensional motion, Center, Code, Computer, Design, Dimensional, Excitation, Experiment, Fluid, Guide, Instability, Motion, Physics, Plasma, Program, Three.

For abstract, see STAR 05 11.
N67-22983 HC$3.00 MF$0.65

PARTICLE ASPECT ANALYSES OF ELECTROMAGNETIC AND ELECTROSTATIC INSTABILITIES DUE TO ANISOTROPIC VELOCITY DISTRIBUTIONS.
Nagoya Univ. (Japan). Research Information Center.
Y. Terashima. Dec 66, 36p IPPJ-56

Descriptors: *Electromagnetic wave, *Electrostatic wave, *Plasma instability, *Velocity distribution, Anisotropy, Cyclotron, Distribution, Electromagnetic, Electrostatic, Instability, Model, Particle, Physical, Plasma, Propagation, Velocity, Wave.

For abstract, see STAR 05 11.
N67-22984 HC$3.00 MF$0.65

EXPERIMENTAL INVESTIGATIONS OF A HYDROGEN ARC IN AN AXIAL MAGNETIC FIELD.
Experimentelle Untersuchungen An Einem Wasserstoff-lichtbogen Im Achsenparallelen Magnetfeld
Institut Fur Plasmaphysik G.M.B.H., Garching (West Germany).
C. Mahn, H. Ringler, and G. Zankl. Nov 66, 44p IPP-3/44
in German, English Summary

Descriptors: *Electric arc, *High temperature plasma, *Hydrogen plasma, *Magnetic field, Arc, Axial, Conduction, Current, Electric, Field, Heat, High temperature, Hydrogen, Loss, Magnetic, Plasma, Power, Production.

For abstract, see STAR 05 11.
N67-22986 HC$3.00 MF$0.65

EXPERIMENT STUDYING THE INTERACTION OF SHOCK WAVES WITH STATIONARY MAGNETIC FIELDS.
Experimente Zur Untersuchung Von Wechselwirkungen Zwischen Stosswellen Und Stationaeren Magnetfeldern
Institut Fur Plasmaphysik G.M.B.H., Garching (West Germany).
H. Klingenberg, and H. Muntenbruch. Nov 66, 32p IPP-3/45
in German, English Summary

Descriptors: *Magnetic field, *Shock wave interaction, Argon, Current, Discharge, Experiment, Field, Flow, Function, Interaction, Magnetic, Plasma, Pressure, Relaxation, Shock, Stationary, Time, Viscosity, Wave.

For abstract, see STAR 05 11.
N67-22988 HC$3.00 MF$0.65

MEASUREMENTS OF THE DIFFUSION RATE OF A WEAKLY IONIZED PLASMA TRANSVERSE TO A MAGNETIC FIELD.
Institut Fur Plasmaphysik G.M.B.H., Garching (West Germany).
K. H. Geissler. Aug 66, 21p IPP-2/50

Descriptors: *Decay rate, *Magnetic field, *Plasma diffusion, Afterglow, Decay, Diffusion, Field, Helium, Ionized, Magnetic, Measurement, Neutral, Plasma, Pressure, Rate, Transverse, Weak.

For abstract, see STAR 05 11.
N67-23078 HC$3.00 MF$0.65

GASDYNAMIC METHODS IN MAGNETOHYDRODYNAMICS FINAL REPORT, 1 JAN. 1963-31 DEC. 1966.
Innsbruck Univ. (Austria). Inst. for Theoretical Physics.
F. Cap. 31 Dec 66, 108p AFOSR-67-0151, AD-645632
Contract AF 61/052/-675

Descriptors: *Gas dynamics, *Magnetohydrodynamic flow, *Plasma flow, Accelerator, Conductivity, Crocco method, Crossed, Dimensional, Dynamics, Electric, Field, Flow, Gas, Generator, Hall effect, Magnetic, Magnetohydrodynamic, Nozzle, One, Plasma, Potential, Propulsion, Steady, Travel, Two, Unsteady, Wave.

For abstract, see STAR 05 11.
N67-23120 HC$3.00 MF$0.65

FIRST ORDER EFFECTS OF PRODUCTION ON THE CONTINUUM THEORY OF SPHERICAL ELECTROSTATIC PROBES.
Pennsylvania Univ., Philadelphia.
I. M. Cohen, and S. Schweitzer. Feb 67, 44p NASA-CR-83545, INDEC-47
Grant NSG-316

Descriptors: *Continuum flow, *Ionized gas, *Langmuir probe, Continuum, Current, Electrostatic, First, Flow, Gas, Homogeneity, Ionization, Ionized, Order, Plasma, Production, Recombination, Spherical, Voltage.

For abstract, see STAR 05 11.
N67-23272 HC$3.00 MF$0.65

INFLUENCE OF STATIC, RADIAL ELECTRIC FIELDS ON TRAPPED PARTICLE INSTABILITIES IN TOROIDAL SYSTEMS.
International Centre for Theoretical Physics, Trieste (Italy).

A. A. Galeev, R. Z. Sagdeev, and H. V. Wong.
Aug 66, 15p IC/66/100
Submitted for Publication

Descriptors: *Electric field, *Toroidal plasma, *Trapped particle, Density, Electric, Field, Gradient, Impurity, Influence, Instability, Ion, Orbit, Particle, Plasma, Radial, Static, Toroid, Trap.

For abstract, see STAR 05 11.
N67-23391 HC$3.00 MF$0.65

PLASMA WAVE REFLECTION IN SLOWLY VARYING MEDIA.
International Centre for Theoretical Physics, Trieste (Italy).
H. L. Berk, C. W. Horton, M. N. Rosenbluth, and N. R. Sudan. Jul 66, 32p IC/66/93

Descriptors: *Thermal plasma, *Wave reflection, Coefficient, Differential, Equation, Formalism, Function, Inhomogeneity, Plasma, Plasma wave, Propagation, Reflection, Slow, Space, Thermal, Variation, Vlasov equation, Wave.

For abstract, see STAR 05 11.
N67-23392 HC$3.00 MF$0.65

SPACE-CHARGE EFFECTS BY NON-THERMAL IONS IN A MAGNETIZED PLASMA.
Royal Inst. of Tech., Stockholm (Sweden). Div. of Plasma Physics.
B. Lehnert. 14 Jan 67, 36p REPT.-67-01

Descriptors: *Collisionless plasma, *Space charge, *Thermal plasma, Charge, Collision, Electric, Electron, Field, Ion, Ionization, Larmor orbit, Magnetic, Magnetization, Maxwell distribution, Nonthermal, Plasma, Space, Thermal.

For abstract, see STAR 05 11.
N67-23398 HC$3.00 MF$0.65

CALCUL DU GLISSEMENT DE LA FREQUENCE DE RESONANCE D'UNE CAVITE CHARGEE PAR UN PLASMA EN PRESENCE OU NON D'UN CHAMP MAGNETIQUE STATIQUE (Calculation of the Resonance Frequency Change for a Cavity Charged by a Plasma With or Without a Static Magnetic Field),
Commissariat a l'Energie Atomique, Saclay (France). Centre d'Etudes Nucleaires.
Gerard Melin. Mar 67, 39p CEA-R-3122
Text in French; Attached summary in English.

Descriptors: (*Plasma medium, Resonance), (*Cavity resonators, Plasma medium), Gas discharges, Microwave frequency, Waveguides, Absorption, Statistical distributions, Perturbation theory, Magnetic fields, High frequency.

In the simple case of a cold plasma with or without static magnetic field, there is given two methods of calculation of resonance frequency shift and absorption in a cylindrical cavity crossed by a plasma column: (1) a perturbation method, already known and used for electronic density measurements, is restated and its application is used for several high frequency cavity modes; (2) an exact method employing Maxwell's equations, which however necessitates a computer, is compared with the first one; it permits a determination of the validity limits of the perturbation method and to draw conclusions. (Author)
PB-174 571 HC$3.00 MF$0.65

DISTRIBUTION DES ENERGIES ELECTRONIQUES DANS UN PLASMA FAIBLEMENT IONISE (Electronic Energy Distribution in a Weakly Ionized Plasma).
Doctoral thesis in French,
Commissariat a l'Energie Atomique, Saclay (France). Centre d'Etudes Nucleaires.
Claude Cesari. Mar 67, 141p CEA-R-3165
Text in French, attached summary in English.

Descriptors: (*Plasma medium, Distribution functions), Electrons, Energy, Statistical distributions, Discharge tubes, Electrostatics, Langmuir probes, Transport properties, Scattering, Kinetic theory, Interactions, Argon, Diffusion, Glow discharges.

The aim of the work was to determine from both the theoretical and experimental points of view the type of distribution function for the electronic energies existing in a positive-column type cold laboratory plasma having an ionization rate of between 0.000001 and 0.0000001. The theoretical analysis, based on the imperfect Lorentz model and taking into account inelastic collisions is developed from the Boltzmann equation. The experimental method which was employed for making an electrostatic analysis of the electronic energies makes use of a Langmuir probe used in conjunction with a transistorized electronic device. A comparison between the experimental and theoretical results yields information concerning the mechanisms governing electronic energy transfer on a microscopic scale. (Author)
PB-174 574 HC$3.00 MF$0.65

L'ELECTROHYDRODYNAMIQUE: UN PROCEDE DE CONVERSION DIRECTE D'ENERGIE A HAUTE TENSION (Electrohydrodynamics: A High-Tension Direct Energy Conversion Process).
Commissariat a l'Energie Atomique, Grenoble (France). Centre d'Etudes Nucleaires.
For primary bibliographic entry see Field 10A.
PB-174 575 HC$3.00 MF$0.65

20J. QUANTUM THEORY

VIOLATION OF CP INVARIANCE AND NON-LEPTONIC DECAYS,
Illinois Univ Urbana Dept of Physics 1422
For primary bibliographic entry see Field 20H.
AD-650 951 HC$3.00 MF$0.65

A REGGE-QUARK MODEL OF HADRON SCATTERING,
Illinois Univ Urbana Dept of Physics 1422
For primary bibliographic entry see Field 20H.
AD-651 038 HC$3.00 MF$0.65

RESEARCH ON NON-EQUILIBRIUM STATISTICAL PHYSICS.
Brussels Univ (Belgium) Faculte des Sciences
For primary bibliographic entry see Field 20M.
AD-651 069 HC$3.00 MF$0.65

TABLE OF HARTREE-FOCK SELF CONSISTENT FIELD WAVE FUNCTIONS WITH EXCHANGE. SUPPLEMENT III,
Aerospace Research Labs Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 3B.
AD-651 072 HC$3.00 MF$0.65

FINAL SCIENTIFIC REPORT.
Oslo Univ (Norway) Inst for Theoretical Physics
For primary bibliographic entry see Field 7D.
AD-651 117 HC$3.00 MF$0.65

QUANTUM MECHANICAL CALCULATIONS OF THE SECOND VIRIAL COEFFICIENTS FOR HYDROGEN.
Technical note,
National Bureau of Standards, Washington, D. C.
Marjorie E. Boyd, and Sigurd Y. Larsen. 10 Apr 67, 18p
Hard copy available from Superintendent of Documents (GPO), Washington, D. C. $0.15.

Descriptors: (*Quantum mechanics, *Hydrogen), Equations of state, Statistical mechanics, Cryogenics, Liquefied gases, Molecular association, Differential equations.

Quantum mechanical second virial coefficients of dilute ortho and para hydrogen have been calculated for the case of a Lennard-Jones potential. These computations cover the temperature range from 0 K to 80 K. Special attention is paid to the behaviour of the Boltzmann and exchange contributions. The purely statistical contribution to the ortho-para difference is shown to vanish to three decimal places by about 10.5 K. Comparison with experimental data indicates that considerable improvement in the potential function and inclusion of non-spherical terms will be required at the low temperatures considered here. (Author)
NBS-TN-412 HC$0.15 MF$0.65

ON THE FUNDAMENTAL CONCEPTS IN THE THEORY OF ELEMENTARY PARTICLES. I - HISTORY OF THE TOMONAGA THEORY OF FIELDS.
Tokyo Univ. (Japan). Dept. of Physics.
Y. Fujimoto, S. Nakamura, and M. Taketani.
1966, 13p

Descriptors: *Elementary particle, *Field theory, *Nuclear physics, *Quantum electrodynamics, Electrodynamics, Elementary, Field, History, Japan, Meson, Neutron, Nuclear, Particle, Physics, Proton, Quantum, Theory.

For abstract, see STAR 05 11.
N67-22954 HC$3.00 MF$0.65

FIFTY YEARS OF QUANTUM THEORY.
50 Jahre Quantentheorie
Royal Aircraft Establishment, Farnborough (England).
W. Heisenberg. Dec 66, 16p RAE-LIB-TRANS-1202
Transl. Into English From Naturwiss. (West Berlin), V. 38, 1951 P 49-55

Descriptors: *History, *Physics, *Quantum theory, Absorption, Atom, Black, Body, Distribution, Emission, Heat, Light, Many-body, Mechanics, Problem, Quantum, Radiation, Specific, Theory, Thermal, Wave.

For abstract, see STAR 05 11.
N67-23082 HC$3.00 MF$0.65

20K. SOLID MECHANICS

STRAIN WAVES IN A 6-CONSTANT CUBIC CRYSTAL,
Rensselaer Polytechnic Inst Troy N Y Dept of Mechanics
For primary bibliographic entry see Field 20B.
AD-650 562 HC$3.00 MF$0.65

DEVELOPMENT OF A MICROCRACKING TECHNIQUE FOR MEASURING IN SITU STRESS AND STRAIN. REPORT 1. LABORATORY TESTS.
Technical rept.,
Army Engineer Waterways Experiment Station Vicksburg Miss
R. L. Stowe. Mar 67, 66p Rept no. TR-6-764-1
Sponsored by DASA. See also AD-650 564.
Availability: Army Engineer Waterways Experiment Station, Vicksburg, Miss. $1.00.

Descriptors: (*Cements, Hardness), (*Grout, Mixtures), Strain gages, Stresses, Reliability, Loading (Mechanics), Strain (Mechanics), Crack propagation, Photographic analysis, Compressive properties, Cracks.

The known relation between load and internal microcracking of hardened portland cement grouts was used to develop a rough, mechanical-type in situ strain gage. Different strength grout mixtures were proportioned, mixed, prepared, and tested. Static tests were conducted to determine compressive strength and to develop a method for confining the test specimens. Unconfined uniaxial dynamic compression tests were conducted at various increments of the ultimate stress. The specimens were then sawed, prepared, and photographed. The photographs were enlarged and examined to determine internal microcracking. The test results indicated that the total amount of internal microcracking per unit area of cross section increases with an increase in dynamic load. Neither of the methods tested for confining the cylinders was effective, and further investigation of this problem is recommended. It is concluded that the microcracking technique has possibilities as a field tool for measuring free-field strain in the in situ material adjacent to a high-yield explosion; however, a full-scale field test should be conducted to further develop and determine the reliability of the technique under actual field conditions.
AD-650 563 MF$0.65

DEVELOPMENT OF A MICROCRACKING TECHNIQUE FOR MEASURING IN SITU STRESS AND STRAIN. REPORT 2. FIELD TESTS.
Technical rept.,
Army Engineer Waterways Experiment Station Vicksburg Miss
R. L. Stowe. Mar 67, 50p Rept no. TR-6-764-2
Sponsored by DASA. See also AD-650 563.
Availability: Army Engineer Waterways Experiment Station, Vicksburg, Miss. $1.00.

Descriptors: (*Cements, Hardness), (*Grout, Mixtures), Strain gages, Stresses, Strain (Mechanics), Cratering, Blast, Explosions, Loading (Mechanics), Crack propagation, Compressive properties, Cracks, Photographic analysis.

A laboratory study of the relation between the magnitude of static and dynamic stresses to which hardened portland cement grout specimens were subjected and the degree of resulting internal microcracking in the specimens had indicated that this relation might permit use of grout cylinders as mechanical-type strain gages for measuring free-field strain in in situ material adjacent to high-yield explosions. This possibility was tested in conjunction with a high-explosive cratering shot detonated by the Air Force Weapons Laboratory. Before the test, 11 grout mixtures covering a range of strengths from 50 percent below to 50 percent above the stresses predicted to result from the 16,000-pound field explosion were proportioned in the laboratory, and 330 2- by 4-inch specimens were prepared. Static compressive tests were performed on specimens of each mixture at 7 and 28 days age, and unconfined, uniaxial, dynamic compression tests were performed at various increments of the estimated ultimate stress. The specimens were then sawed; slices were prepared and photographed. The photographs were enlarged and examined to determine internal microcracking. In the field, three 5-1/2-inch-diameter by 42-foot-deep boreholes were drilled 20, 30, and 40 feet from the point of detonation. Specimens of the 11 grout mixtures were placed in the holes in a medium-matching grout, subjected to the blast, recovered (except for about a third of the instruments which were lost in the crater), returned to the laboratory, and examined for extent of induced microcracking. The laboratory data were used for standard curves from which a correlation of the field data was made.
AD-650 564 MF$0.65

PLASTIC FLOW RATES IN NYLON INTERPRETED IN TERMS OF DISLOCATION MOTION,
Illinois Univ Urbana Dept of Mining Metallurgy and Petroleum Engineering
For primary bibliographic entry see Field 11I.
AD-650 578 HC$3.00 MF$0.65

BUCKLING AND ULTIMATE STRENGTHS OF PLATING LOADED IN EDGE COMPRESSION.
David Taylor Model Basin Washington D C Structural Mechanics Lab
For primary bibliographic entry see Field 13J.
AD-650 594 HC$3.00 MF$0.65

SOME CASES OF VIBRATION FORCED BY BASE MOTIONS OR BY EXTERNAL FORCES.
David Taylor Model Basin Washington D C Structural Mechanics Lab
For primary bibliographic entry see Field 13J.
AD-650 600 HC$3.00 MF$0.65

PHONON AND ELECTRON DRAG COEFFICIENTS IN SINGLE-CRYSTAL ALUMINUM.
Columbia Univ New York Inst for the Study of Fatigue and Reliability
For primary bibliographic entry see Field 20A.
AD-650 612 Not available from CFSTI.

BEHAVIOR OF COMPRESSIVELY LOADED REINFORCING WIRES.
Interim technical rept.,
Stanford Research Inst Menlo Park Calif 0511
Leonard R. Herrmann, William R. Mason, and S. T. K. Chan. Jan 67, 49p
Contract N123 (60530)-55641A
Prepared in cooperation with California Univ., Berkeley. Structural Engineering Lab., rept. no. 67-2.

Descriptors: (*Wire, Buckling (Mechanics)), Reinforcing materials, Loading (Mechanics), Compressive properties, Stresses, Beams (Structural).

A theoretical investigation of the compressive response of a wire embedded in a matrix is reported. In the first two sections consideration is given to the beam-column behavior of an initially crooked wire embedded in a matrix which is subjected to a state of uniaxial stress. A plot of the effective stiffness of the wire as a function of the wire's initial crookedness is given. Secondly, consideration is given to the possibility of buckling, within the matrix, of a compressively loaded straight wire. A plot of the buckling load of the wire as a function of the ratio of the wire's and matrix's shear moduli is given. Two procedures are developed for the prediction of the lateral support offered to the wire by the matrix. Both procedures are developed by treating the matrix as a three-dimensional elastic solid, however, only the first of the two methods completely satisfies the displacement continuity requirements between the wire and the matrix. (Author)
AD-650 617 HC$3.00 MF$0.65

ON THE PLANE STRAIN DYNAMIC RESPONSE OF A CYLINDRICAL SHELL UNDER LATERAL LOADS.
Technical rept.,
State Univ of New York Buffalo Div of Interdisciplinary Studies and Research
Herbert Reismann, and Peter S. Pawlick. Apr 67, 57p Rept no. 22
AROD-5637:2-E
Grant DA-ARO (D)-31-124-G688

Descriptors: (*Cylindrical bodies, Strain (Mechanics)), (*Structural shells, Strain (Mechanics)), Loading (Mechanics), Dynamics, Differential equations, Theory.

An analytical investigation of the response of a circular cylindrical shell in plane strain acted upon by arbitrary, nonaxisymmetric, time dependent normal surface tractions was carried out. Solutions were generated for three levels of shell theory: (a) membrane theory, (B) Flugge theory (combined bending and membrane effects), (c) improved theory (including the effects of shear deformation and rotatory inertia). The solutions are expressed in terms of the characteristic response predicted by each theory. Finite series approximations are used to determine the characteristic response to any desired degree of accuracy. A numerical study of the initial response of the shell to a radially directed, concentrated, pure impulse was performed and detailed comparisons between the three shell theories are presented. (Author)
AD-650 624 HC$3.00 MF$0.65

A FATIGUE APPARATUS FOR USE IN STUDIES OF CRACK PROPAGATION AND DISLOCATION MORPHOLOGY IN FATIGUE.
Technical rept.,
Northwestern Univ Evanston Ill Dept of Materials Science
Thomas B. Wade. 31 Jan 67, 95p
Contract Nonr-1228 (32)
See also AD-627 811.

Descriptors: (*Fatigue (Mechanics), *Crystal lattice defects), (*Crack propagation, Metals), Failure (Mechanics), Stresses, Loading (Mechanics), Heat treatment, Vacuum apparatus, Temperature control, Cracks.

A direct stress hydraulic fatigue apparatus has been constructed for use in a study of fatigue behavior and crack propagation in metals. The loading apparatus provides a static load, either tensile or compressive, of up to 290 pounds with a superimposed cyclic load (tensile and/or compressive) of up to 3350 pounds. The frequency of loading may be varied continuously from 560 cpm to 1250 cpm. Both the magnitude of load and the frequency of loading may be altered at any time during a test. Tests may be conducted in various gaseous and vapor environments as well as in vacuum of up to 0.000001. Temperature control is not included in the initial design, but may be added easily. Auxilliary equipment has also been constructed for sample preparation and observation of crack propagation.
AD-650 697 HC$3.00 MF$0.65

ON THE IN-VACUO VIBRATIONS OF SIMPLY SUPPORTED RING-STIFFENED CYLINDRICAL SHELLS,
David Taylor Model Basin Washington D C Structural Mechanics Lab
For primary bibliographic entry see Field 13M.
AD-650 699 Not available from CFSTI.

GENERAL RECIPROCITY RELATION,
David Taylor Model Basin Washington D C Structural Mechanics Lab
For primary bibliographic entry see Field 20A.
AD-650 700 Not available from CFSTI.

EXPERIMENTAL TECHNIQUES FOR MEASURING VIBRATIONS USING A LASER INTERFEROMETER.
Navy Marine Engineering Lab Annapolis Md
For primary bibliographic entry see Field 20F.
AD-650 720 HC$3.00 MF$0.65

MECHANICS OF COMPOSITE MATERIALS. PART II. THEORETICAL ASPECTS.
Air Force Materials Lab Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 11D.
AD-650 829 HC$3.00 MF$0.65

HIGH-TEMPERATURE VACUUM FATIGUE TESTING OF TYPE 316 STAINLESS STEEL AND INCONEL X WITH A RESONANCE-TYPE MACHINE,
Naval Research Lab Washington D C

H. H. Smith, P. Shahinian, and M. R. Achter. 27 Mar 67, 17p Rept no. NRL-6489

Descriptors: (*Fatigue (Mechanics), Nickel alloys), (*Stainless steel, Nickel alloys), Tests, Vacuum apparatus, Environmental tests, Vibrators (Mechanical), Resonance, High-temperature research.
Identifiers: Inconel X.

A new resonance-type flexural fatigue machine has been used to test Inconel X, a low damping capacity material, and Type-316 stainless steel, a high damping material, at 500 degrees and 800 degrees C. A comparison was made of the reproducibility of the data obtained by various test procedures with smooth and notched specimens. Observations were made of the type of cracking in these materials. The progression of cracking appeared to be reflected in resonant frequency changes during the test. The reproducibility of the fatigue data, in particular of the Inconel X, which has a sharp resonance, is sufficiently good to permit distinguishing environmental effects, the main purpose for which the equipment was designed. (Author)
AD-650 934 HC$3.00 MF$0.65

EVALUATION OF ALUMINUM ALLOY 7001-T75.
Aerospace Industries Association of America Inc Washington D C
For primary bibliographic entry see Field 11F.
AD-650 948 MF$0.65

ANALYSIS OF CLAMPED-FREE CYLINDRICAL SHELLS UNDER THE ACTION OF NONAXISYMMETRIC LOADS AND TEMPERATURES,
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
Robert M. Rivello, and Tom M. Rankin. 8 Mar 63, 41p Rept no. CF-3021
Contract NOw-62-0604

Descriptors: (*Cylindrical bodies, Stresses), (*Structural shells, Stresses), Loading (Mechanics), Thermal stresses, Aeroelasticity, Deflection, Pressure vessels, Mathematical analysis.

A method of analysis for computing deformations and stresses in a clamped-free circular cylindrical shell under the action of nonaxisymmetric loads and temperatures is given. The analysis, which is based upon the Rayleigh-Ritz Method and the principle of the stationary value of the total potential, is suitable for a shell with a longitudinally varying wall thickness and elastic modulus. The computation was programmed for routine solution on the IBM 7090 or 7094 digital computers. Total machine time for a single loading case is 0.6 minutes on the 7094 machine. The results of an experimental study of a clamped-free cylinder under a concentrated radial force are given and are compared with theoretical predictions. The theoretical and experimental deflection results are found to be in excellent agreement for the case where the force is near the free end but the theory seriously underestimates the deflections if the concentrated force is applied in the vicinity of the clamped end. Although it was not verified, based upon the results of the concentrated loading, it is believed that the accuracy of the method for smoothly varying distributed loads should be very good. (Author)
AD-650 976 HC$3.00 MF$0.65

DYNAMIC ANALYSIS OF THE TETHERING CABLE PORTION OF A HIGH ALTITUDE TETHERED BALLOON SYSTEM UNDER FULLY DEPLOYED CONDITIONS.
National Engineering Science Co Pasadena Calif
For primary bibliographic entry see Field 1C.
AD-651 024 HC$3.00 MF$0.65

APPLICATION OF A CORRECTIVE-FUNCTION METHOD IN CALCULATIONS OF DEFORMATIONS OF CANTILEVER PLATES,
Foreign Technology Div Wright-Patterson AFB Ohio
V. M. Frolov. 20 Feb 67, 59p Rept no. FTD-MT-64-365
TT-67-61674
Primenenie Metoda Korrektiruyushchei Funktsii v Raschetakh Deformatsii Knosolnykh Plastin, edited machine trans. of Tsentralnyi Aerogidrodinamicheskii Institut. Trudy (USSR) v705 35p 1957.

Descriptors: (*Sheets, Deformation), USSR, Structural properties, Stresses, Elasticity, Bending, Theory, Cantilever beams, Strain (Mechanics).

A method of calculating bending deflections and stresses for rectangular and triangular cantilever plates is given. The calculations are conducted on the assumption that plate cross sections parallel to the root are distorted during loading. The calculation method makes it possible to obtain values of functions of bending deflections and functions of certain stress components more precisely than by calculation according to the beam theory. The results of calculations by the proposed method are compared with the results of calculations of other authors and with experiments. (Author)
AD-651 084 HC$3.00 MF$0.65

DEVELOPMENT OF A POWER SPECTRAL GUST DESIGN PROCEDURE FOR CIVIL AIRCRAFT.
Lockheed-California Co Burbank
For primary bibliographic entry see Field 1C.
AD-651 152 HC$3.00 MF$0.65

THE PLASTIC RESPONSE OF SOLIDS,
Illinois Univ Urbana
J. J. Gilman. 1967, 40p
Contract Nonr-3985 (06), Grant DA-ARO (D)-31-124-G873
Supported by AEC Contract AT (11-1)-1198.

Descriptors: (*Creep, *Dislocations), (*Plasticity, Solids), Drag, Stresses, Polymers, Dynamics, Fluid flow, Transport properties, Flutter, Dispersion hardening, Turbulence, Gas flow, Crystals.

Past developments of the micro-dynamical description of plastic flow are outlined, and the successes of the theory are mentioned. Then some extensions in scope are suggested and discussed. These include: application to polymeric solids, collective dislocation behavior, and dynamics of precipitation hardening. The difficulty that the flowing-state differs from the post-flowing-state is emphasized. It is proposed that dislocation lines exist in noncrystalline solids and provide a convenient description for local shear correlations. The possibility that flutter is induced in moving dislocations by turbulent phonon-gas flow is considered. Finally, an atomic model for dislocation mobility in covalent crystals is presented. (Author)
AD-651 153 HC$3.00 MF$0.65

ON OBTAINING SOLUTIONS IN NONLINEAR VISCOELASTICITY.
Technical rept.,
California Univ Berkeley Div of Applied Mechanics
R. M. Christensen. Oct 66, 28p Rept no. AM-66-15
Contract Nonr-222 (69)

Descriptors: (*Viscoelasticity, Theory), Stresses, Boundary value problems, Torsion.

A derivation is given of a particular form of the isothermal nonlinear stress constitutive relation for materials with fading memory. This particular derivation results in a form for the constitutive relations that is well suited for application in solving boundary-value problems. The resulting forms are applied to obtain the exact solution for the torsion of a right circular isotropic viscoelastic cylinder. Several effects due to the nonlinearity of the problem are discussed. (Author)
AD-651 183 HC$3.00 MF$0.65

A LINEAR THEORY OF STRAIGHT ELASTIC RODS.
Technical rept.,
California Univ Berkeley Div of Applied Mechanics
A. E. Green, N. Laws, and P. M. Naghdi. Feb 67, 31p Rept no. AM-67-1
Contract Nonr-222 (69)

Descriptors: (*Rods, Elasticity), Theory, Linear systems, Equations of motion.

The paper is based on the work of Green and Laws who have given a general thermodynamical theory of rods which is valid for any material. Here, starting with the general non-linear theory of elastic rods, we derive a linear theory allowing for thermal effects. The resulting free energy as a quadratic function of kinematic variables is restricted by certain symmetry conditions. The basic equations then separate into four groups, two for flexure, one for torsion and one for extension of the rod with temperature effects occurring only in the latter group. Wave propagation along an infinite rod is considered. There are two wave speeds for each type of flexure, two for torsion and three for isothermal extension and all wave speeds depend on the wave length. (Author)
AD-651 184 HC$3.00 MF$0.65

A CLASS OF VISCOELASTIC-PLASTIC MEDIA,
A. E. Green, and P. M Naghdi. Mar 67, 19p Rept no. AM-67-2
Contract Nonr-222 (69)

Descriptors: (*Viscoelasticity, Continuum mechanics), (*Plasticity, Continuum mechanics), Thermodynamics, Equations, Nonlinear systems, Deformation.

A class of nonlinear constitutive equations of rate-type are considered for viscoelastic-plastic continua and explicit restrictions are derived from thermodynamics. Some aspects of the associated linearized theory with isothermal deformations are also discussed. (Author)
AD-651 185 HC$3.00 MF$0.65

INVESTIGATION OF PLATES AND SHELLS UNDER EXTERNAL LOADING AND ELEVATED TEMPERATURES.
Final rept.,
Polytechnic Inst of Brooklyn N Y Dept of Aerospace Engineering and Applied Mechanics
Joseph Kempner. Mar 67, 18p
AFOSR-67-0931, PIBAL-933
Contract AF 49 (638)-1360
See also AD-630 523.

Descriptors: (*Structural shells, Loading (Mechanics)), (*Structures, Creep), Cylindrical bodies, Buckling (Mechanics), Stresses, Bending, Thickness, Deformation, Stiffened cylinders, Structural properties, Sheets, Temperature.

The report describes investigations of plates and shells under external loading and elevated temperatures, and includes problems of special interest to designers of missiles and aircraft. Chapter 1 discusses the analysis of the postbuckling (large-deflection theory) of noncircular (oval) cylindrical shells under axial compression and related experimental investigations, the application of exact finite deformation theory of three-dimensional elasticity to the stability problem of thick-walled cylinders under combined lateral pressure and axial compression, and investigations of nonlinear membrane shell problems. Chapter 11 describes work

on the analysis of the effects of concentrated loads applied to reinforcing frames of finite and infinitely long circular cylindrical shells. Chapter III presents the results of investigations of the effects of creep in structures, with particular emphasis on the effects of line loads, the bending of variable thickness circular plates, and stress concentrations due to circular holes in large plates under uniaxial or biaxial loads. (Author)
AD-651 204 HC$3.00 MF$0.65

AN EXTENSION OF THE KANTOROVICH METHOD.
New York Univ N Y Dept of Aeronautics and Astronautics
For primary bibliographic entry see Field 12A.
AD-651 206 HC$3.00 MF$0.65

SOLUTION OF A CIRCULAR RING STRUCTURAL PROBLEM.
Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
For primary bibliographic entry see Field 13M.
N65-82307 HC$3.00 MF$0.65

STRUCTURAL ANALYSIS AND MATRIX INTERPRETIVE SYSTEM (SAMIS) PROGRAM REPORT TECHNICAL MEMORANDUM, FEB. 1963 -DEC. 1965.
Philco Corp., Palo Alto, Calif. Western Development Labs.
For primary bibliographic entry see Field 9B.
For abstract, see STAR 05 11.
N67-22062 HC$3.00 MF$0.65

STRUCTURAL ANALYSIS AND MATRIX INTERPRETIVE SYSTEM (SAMIS) PROGRAM TECHNICAL REPORT, FEB. - AUG. 1966.
Philco Corp., Palo Alto, Calif. Western Development Labs.
For primary bibliographic entry see Field 9B.
For abstract, see STAR 05 11.
N67-22063 HC$3.00 MF$0.65

ANALYTICAL STUDY OF THE FRACTURE OF LIQUID-FILLED TANKS IMPACTED BY HYPERVELOCITY PARTICLES.
Drexel Inst. of Tech., Philadelphia, Pa.
P. C. Chou, J. Hoburg, and R. Schaller. Mar 67, 74p NASA-CR-72169, DIT-160-9
Grant NSG-270

Descriptors: *Fuel tank, *Hypervelocity impact, *Shock wave, *Stress wave, Energy, Fracture, Fuel, Hypervelocity, Impact, Kinetic, Liquid, Projectile, Shock, Stress, Tank, Wall, Water, Wave.

For abstract, see STAR 05 11.
N67-22068 HC$3.00 MF$0.65

DEVELOPMENT OF NONDESTRUCTIVE, AUTOMATIC TECHNIQUE FOR MONITORING AND RECORDING OF FATIGUE CRACK GROWTH FINAL REPORT.
Republic Aviation Corp., Farmingdale, N. Y.
F. J. Hoppe, and N. Inman. 9 Feb 67, 54p NASA-CR-66320, FHR-3294-2
Contract NAS1-5944

Descriptors: *Crack propagation, *Fatigue test, *Nondestructive testing, Automatic, Crack, Detection, Fatigue, Monitor, Nondestructive, Probe, Propagation, Recording, Surface, Test, Testing, Tracking, Tuning, Ultrasonic, Wave.

For abstract, see STAR 05 11.
N67-22070 HC$3.00 MF$0.65

GENERALISED AIRFORCES ON A CYLINDRICAL SHELL OSCILLATING HARMONICALLY IN A UNIFORM FLOW.
Royal Aircraft Establishment, Farnborough (England).
D. E. Davies. Dec 65, 66p RAE-TR-65295

Descriptors: *Airflow, *Cylindrical shell, *Harmonic oscillation, *Oscillating cylinder, *Uniform flow, Analysis, Cylinder, Flow, Force, Harmonic, Infinite, Numerical, Oscillation, Perturbation, Pressure, Shell, Uniform.

For abstract, see STAR 05 11.
N67-22788 HC$3.00 MF$0.65

INFLUENCE OF CHEMICAL CONTOURING ON THE FATIGUE AND SUSTAINED LOAD PROPERTIES OF HIGH TENSILE STEEL SHEET.
Saunders-roe, Ltd. (Gt. Brit.)
For primary bibliographic entry see Field 11F.
For abstract, see STAR 05 11.
N67-22798 HC$3.00 MF$0.65

FINITE ELEMENT MODELING OF A CANTILEVER BEAM.
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
J. F. Kuzanek. Mar 67, 33p NASA-TM-X-55743, X-321-67-97

Descriptors: *Bending vibration, *Cantilever beam, *Inertia, *Transverse vibration, Aluminum, Analysis, Beam, Bending, Cantilever, Computer, Data, Digital, Flexibility, Frequency, Rotation, Transverse, Vibration.

For abstract, see STAR 05 11.
N67-22881 HC$3.00 MF$0.65

INFLUENCE OF THE CYCLE RATIO ON THE FATIGUE STRENGTH OF DRILLED FLAT BARS OF ST 37 STEEL MATERIAL. PART B - MULTI-STEP AND PROGRAM TESTS.
Einfluss Unterschiedlich Hoher Und Haeufiger Vorbelastungen Auf Die Schwingfestigkeit Gebohrter Flachstaebe Aus St 37 Teil B - Mehrstufen- Und Betriebsfestigkeitsversu
che
Laboratorium Fur Betriebsfestigkeit, Darmstadt (West Germany).
E. Gassner, and W. Schuetz. 1966, 116p FB-58, PT. B, ICAF-348

Descriptors: *Bar, *Fatigue, *Steel, Cycle, Graph, Lifetime, Limit, Ratio, Strength, Table.

For abstract, see STAR 05 11.
N67-22961 HC$3.00 MF$0.65

ON THE DETERMINATION OF SHELLS BEYOND THE ELASTIC RANGE.
Sur le Calcul des Coques Hors Du Domaine Elastique
France. Office National D Etudes Et de Recherches Aerospatiales, Chatillon-sous-bagneux.
R. Valid. 1966, 118p
in French, English Summary Its Note Tech. No. 102

Descriptors: *Elastic shell, *Shell theory, Boundary, Displacement, Elastic, Kirchhoff law, Loading, Love equation, Principle, Range, Shell, Theory, Thickness, Variation, Virtual.

For abstract, see STAR 05 11.
N67-22999 HC$3.00 MF$0.65

FATIGUE STRENGTH OF NOTCHED AND UNNOTCHED SPECIMENS OF AL MG SI 1 (6061 T-6) AND AL MG 5/5056/.
Laboratorium Fur Betriebsfestigkeit, Darmstadt (West Germany).
For primary bibliographic entry see Field 11F.
For abstract, see STAR 05 11.
N67-23015 HC$3.00 MF$0.65

VIBRATIONS OF ELASTICALLY RESTRAINED THIN CYLINDRICAL SHELLS SUBJECTED TO VISCOUS DAMPING.
Sur les Vibrations des Coques Cylindriques Minces Soumises A Un Amortissement Visqueux
Office National D Etudes Et de Recherches Aerospatiales, Paris (France).
S. J. Britvec. 1966, 55p ONERA-TN-101/1966/
in French, English Summary

Descriptors: *Cylindrical shell, *Structural vibration, *Thin walled shell, *Viscous damping, Cylinder, Damping, Eigenvalue, Elastic, Perturbation, Restraint, Shell, Solution, Structural, Technique, Thin, Vibration, Viscous, Wall.

For abstract, see STAR 05 11.
N67-23076 HC$3.00 MF$0.65

APPLICATION OF A DOUBLE LINEAR DAMAGE RULE TO CUMULATIVE FATIGUE.
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
C. R. Ensign, J. C. Freche, and S. S. Manson. Apr 67, 40p NASA-TN-D-3839
Contract 129-03-15-06-22

Descriptors: *Crack propagation, *Damage, *Metal fatigue, Bending, Crack, Cumulative, Fatigue, Formation, Linear, Loading, Metal, Prediction, Propagation, Rotation, Steel.

For abstract, see STAR 05 11.
N67-23284 HC$3.00 MF$0.65

AN EMPIRICAL EQUATION RELATING FATIGUE LIMIT AND MEAN STRESS.
National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
For primary bibliographic entry see Field 11F.
For abstract, see STAR 05 11.
N67-23286 HC$3.00 MF$0.65

COMPRESSIVE BEHAVIOR OF PLATES FABRICATED FROM GLASS FILAMENTS AND EPOXY RESIN.
National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
J. G. Davis, Jr., and G. W. Zender. Apr 67, 34p NASA-TN-D-3918
Contract 124-08-01-10-23

Descriptors: *Compression testing, *Epoxy resin, *Glass fiber, *Reinforced plastic, Aluminum, Buckling, Composite, Compression, Epoxy, Fiber, Filament, Glass, Material, Plastic, Reinforced, Resin, Strength, Stress, Testing, Youngs modulus.

For abstract, see STAR 05 11.
N67-23297 HC$3.00 MF$0.65

TECHNIQUES FOR THE OBSERVATION OF MICROMETEORITE CRATERS IN METAL SUBSTRATES UTILIZING ELECTRON MICROGRAPHIC REPLICA METHODS.
TRW Systems, Redondo Beach, Calif.
J. C. Slattery, and R. Sloan. Apr 67, 61p NASA-CR-768
Contract NASW-1116

Descriptors: *Aluminum, *Electron microscopy, *Hypervelocity cratering, *Plastic film, *Stainless steel, Atom, Crater, Cratering, Cross section, Dimension, Electron, Film, Hypervelocity, Impact, Measurement, Micrography, Microparticle, Microscopy, Plastic, Replica, Reproduction, Stainless, Steel, Substrate, Technique, Thin.

For abstract, see STAR 05 11.
N67-23307 HC$3.00 MF$0.65

PLANE-STRESS, ELASTIC-PLASTIC STATES IN THE VICINITY OF CRACK TIPS.

Washington Univ., Seattle.
A. S. Kobayashi, R. C. Shah, and S. Woo. May 67, 49p NASA-CR-772
Grant NSG-532

Descriptors: *Crack, *Elastoplasticity, *Finite difference method, *Relaxation method, *Stress analysis, *Thin plate, Analysis, Boundary, Difference, Distribution, Finite, Griffith fracture theory, Growth, Loading, Method, Numerical, Plane, Plate, Relaxation, Shear, Stress, Tension, Thin, Tip, Von mises theory.

For abstract, see STAR 05 11.
N67-23308 HC$3.00 MF$0.65

STRESS AND STRAIN IN ROLLING BODIES IN CONTACT,
Massachusetts Inst. of Tech., Cambridge. Engineering Projects Lab.
Igor L. Paul, and P. Ranganath Nayak. 1 Nov 66, 43p
Contract C-85-65

Descriptors: (*Bearings, Mechanical properties), (*Spheres, Mechanical properties), Vehicle wheels, Stresses, Strain (Mechanics), Computer programs, Roll, Mathematical analysis.

The three-dimensional solution of the stresses and strains in the contact region of a rolling wheel which carries normal, lateral and tangential loads is sought. Because of the complexity of the general problem a preliminary step has been to seek the solution for two spheres of similar material rolling on each other. The approach has been to divide the 'locked' region into a grid of n cells formed by fixed circular grid lines and variable grid lijes which have a shape similar to an assumed shape for the boundary between the 'locked' and 'slipped' regions. The equations and boundary conditions were formulated and a computer program solves 2n simultaneous equations to find the stress distributions. If all boundary conditions are not satisfied by the solution the computer program shifts the grid points according to an error criterion and reiterates the solution. The results were encouraging although the final solution is not yet available. The results for the two spheres can be extended to the case of a wheel rolling on a surface of dissimilar material. This solution is of considerable importance for high speed rail travel because forward and sidewise creep (which are vital parameters in stability calculations) and rolling stresses (fatigue, etc.) can be calculated from the complete picture of stresses and strains in the region. (Author)
PB-173 651 HC$3.00 MF$0.65

ROUND-ROBIN COLD BRITTLENESS TESTS OF BALLOON FILMS.
Hauser Research and Engineering Co., Boulder, Colo.
For primary bibliographic entry see Field 1C.
PB-174 521 HC$3.00 MF$0.65

20L. SOLID STATE PHYSICS

AN INVESTIGATION OF BASIC MECHANISMS OF TRANSIENT HIGH ENERGY RADIATION EFFECTS IN INSULATORS AND SEMICONDUCTORS.
Hughes Aircraft Co., Fullerton, Calif. Ground Systems Group.
For primary bibliographic entry see Field 9A.
AD-462 730 HC$3.00

PHONON AND ELECTRON DRAG COEFFICIENTS IN SINGLE-CRYSTAL ALUMINUM.
Columbia Univ New York Inst for the Study of Fatigue and Reliability
For primary bibliographic entry see Field 20A.
AD-650 612 Not available from CFSTI.

SURFACE-STATE MODELS FOR CLEAN AND OXYGEN-COVERED GERMANIUM.
Revised ed.,
Pennsylvania State Univ University Park Dept of Physics
D. R. Frankl. 14 Oct 66, 14p Rept no. 3
Contract Nonr-656 (34)
Revision of manuscript submitted 1 Aug 66.
Availability: Published in Surface Science v6 p334-44 1967.

Descriptors: (*Germanium, Surface properties), Oxidation, Electrical conductance, Carriers (Semiconductors), Oxygen, Concentration (Chemistry), Mathematical models, Semiconductors.

Experimental results on the conductivity and field-effect mobility of clean germanium, and the changes in these properties under progressive oxygen-coverage, are reviewed. The changes take place in three rather well-defined stages. Simple surface-state distributions are found by trial-and-error, which account for each of these stages. All three appear to be due pairwise (donor and acceptor) changes in surface state concentrations. (Author)
AD-650 629 Not available from CFSTI.

NITROGEN TETROXIDE-STAINLESS STEEL CRYOPANEL CORROSION AND COATING DEGRADATION IN SPACE CHAMBER PROPULSION TESTING,
Arnold Engineering Development Center Arnold Air Force Station Tenn
For primary bibliographic entry see Field 11F.
AD-650 690 HC$3.00 MF$0.65

THE INTERACTION OF NITROUS OXIDE WITH GERMANIUM SURFACES,
Lehigh Univ Bethlehem Pa Surface Chemistry Lab
For primary bibliographic entry see Field 7D.
AD-650 706 Not available from CFSTI.

INTERACTION OF MAGNETO-PLASMA WAVES IN A TWO COMPONENT SOLID STATE PLASMA,
Brown Univ Providence R I Dept of Physics
For primary bibliographic entry see Field 20I.
AD-650 708 Not available from CFSTI.

de HAAS-van ALPHEN EFFECT IN FERROMAGNETIC NICKEL,
Chicago Univ Ill
D. C. Tsui, and R. W. Stark. 8 Sep 66, 5p
Research supported in part by AROD, A. P. Sloan Foundation and ARPA.
Availability: Published in Physical Review Letters v17 n16 p871-5 Oct 17 1966.

Descriptors: (*Nickel, Band theory of solids), Ferromagnetic materials.
Identifiers: DE Hass-van Alphen effect.

An investigation was made of the de Haas-van Alphen effect in nickel. The results are discussed in terms of the models which have been recently proposed for the band structure of ferromagnetic nickel. (Author)
AD-650 715 Not available from CFSTI.

ELECTRON COLLISION EFFECTS IN SEMICONDUCTORS,
University Coll of South Wales and Monmouthshire Cardiff Dept of Applied Mathematics
Peter T. Landsberg. May 66, 72p Rept no. Scientific-6
AFCRL-67-0163
Contract AF 61 (052)-664
Presented at the Theoretical Physics Institute, University of Colorado, Summer 1965.

Descriptors: (*Semiconductors, Band theory of solids), Great Britain, Transport properties, Interactions, Functions, Electron transitions.

A survey is given of the basic theoretical principles governing electron collision effects in semiconductors. Some of the results presented are new, but they are integrated with older work where it seemed desirable. Topics covered include: Transition rates for band-band and band-trap Auger effects; threshold for band-band impact ionization; overlap integrals; recombination statistics and departures from the quasi-fermi level distribution. (Author)
AD-650 717 HC$3.00 MF$0.65

THEORY OF OHMIC CONTACTS.
Army Electronics Command Fort Monmouth N J
For primary bibliographic entry see Field 9A.
AD-650 738 HC$3.00 MF$0.65

DIFFUSION IN ORGANIC CRYSTALS.
Semi-annual Technical Report, 1 Oct 66-31 Mar 67.
Franklin Inst Research Labs Philadelphia Pa Chemistry Dept
31 Mar 67, 42p Rept no. B2130-T-11
AROD-4168:13-P
Contract DA-31-124-ARO (D)-142, ARPA Order-462
See also AD-631 698.

Descriptors: (*Polycyclic compounds, Crystals), (*Anthracenes, Diffusion), (*Crystal growth, Anthracenes), Transport properties, Preparation, Purification, Carriers (Semiconductors), Crystal substructure, Electron microscopy, Organic materials, Photoelectric effect, Crystal lattice defects.
Identifiers: Organic semiconductors.

Further self-diffusion studies were carried out on anthracene crystals at high temperature. A comparison was made between crystals grown from the vapor, the melt and commercially supplied melt-grown crystals in which it was found that the secondary or fast diffusion process increased in the order vapor-grown < melt-grown < commercial melt-grown. A thorough investigation was made into the purity and perfection of a large melt-grown anthracene crystal. Segregation coefficients were obtained for hole and electron traps introduced by thermal decomposition in the melt. An exhaustive study was made on the growth of anthracene crystals from the vapor phase as a function of purification technique, ambient growth atmosphere, growth temperature, supersaturation and the effect of light. The best crystals obtained by this technique gave carrier lifetimes a factor of 5 lower than the best melt-grown crystals. An attempt was also made to examine the physical substructure of anthracene by electron microscopy.
AD-650 740 HC$3.00 MF$0.65

ELECTRON SPIN RESONANCE OF THE ICI(-) Vk-CENTER.
Technical repts.,
Cornell Univ Ithaca N Y Lab of Atomic and Solid State Physics
M. L. Meistrich, and L. S. Goldberg. 20 May 66, 4p Rept no. TR-2, TR-7
Contracts Nonr-401 (54), Nonr-401 (47)
Availability: Published in Solid State Communications v4 p469-71 1966.

Descriptors: (*Crystal lattice defects, *Electron spin resonance), (*Iodine compounds, Electron spin resonance), (*Chlorides, Electron spin resonance), Potassium compounds, Iodine, Lead, Solid solutions, Crystals, Color centers, Cryogenics, Nuclear spins, Hamiltonian.

The electron spin resonance of the ICl (-) Vk-center was observed in KCl: 1:Pb below 35K. By reorientating the centers with polarized light, the ESR spectrum was greatly simplified. The parameters of the spin Hamiltonian were calculated and are consistent with the proposed model of Vk-centers. (Author)
AD-650 770 Not available from CFSTI.

GALVANOMAGNETIC EFFECTS OF n-InSb BELOW 1 K.
Technical rept. no. 2, 1 Nov 64-31 Dec 66,
Colorado Univ Boulder Dept of Physics and Astrophysics
J. H. Wilson, W. F. Love, and S. C. Miller. Mar 67, 22p
Contract Nonr-1147 (12)

Descriptors: (*Indium antimonides, Magnetic properties), (*Cryogenics, Indium antimonides), Semiconductors, Transport properties, Scattering, Hall effect, Electrical conductance.

Some galvanomagnetic properties of n-InSb have been measured in temperature range from 4K to 0.4K with donor concentrations between 2.6 x 10 to the 15th power/cu cm and 7.5 x 10 to the 13th power/cu cm. The electrical conductivity in zero magnetic field indicated the lack of freezeout for all donor concentrations measured. The transverse magnetoresistance of samples with donor concentrations of 7.5 x 10 to the 13th power/cu cm and 1.0 x 10th to the 14th power/cu cm showed a saturation in magnetic fields less than 10 koe provided the temperature was less than 1K. At temperatures above 1K, the saturation was not observed in any of the samples in magnetic fields up to 16 koe. A possible interpretation of the saturation effect is given by assuming a hydrogen molecule model of the impurities and by taking the dominant scattering mechanism to be due to neutral impurities. (Author)
AD-650 771 HC$3.00 MF$0.65

THERMODYNAMIC FLUCTUATIONS OF THE ORDER PARAMETER IN TYPE II SUPERCONDUCTORS NEAR THE UPPER CRITICAL FIELD H sub c2.
Technical rept.,
Cornell Univ Ithaca N Y Lab of Atomic and Solid State Physics
Gert Eilenberger. Apr 67, 29p Rept no. TR-19
Contract Nonr-401 (38)

Descriptors: (*Superconductors, Thermodynamics), Free energy, Magnetic fields, Penetration, Equations, Wave functions, Crystal lattices, Quantum statistics.

An investigation was made of the mean square deviation of the order parameter from its equilibrium for Type II Superconductors, assuming that the Gibbs free energy is given by a Ginzburg-Landau type functional. It turns out, that the equilibrium function, which is already varying with position because of the penetrating magnetic flux, resists distortion much less than the constant order parameter in type I superconductors. Therefore, the mean square deviation becomes equal in magnitude to the square of the equilibrium order parameter in the magnetic field range ((H sub c2)-B)/(H sub c2) approx. < 0.0001 to 0.00001. This means, that the range of magnetic fields, in which Ginzburg-Landau type descriptions should fail and a singular behavior might show up seems not entirely out of reach of present experimental techniques in contrast to the situation in type I superconductors. (Author)
AD-650 856 HC$3.00 MF$0.65

EFFECTIVE MASS OF FREE CARRIERS IN SEMICONDUCTORS AS DETERMINED FROM INFRARED REFLECTIVITY MEASUREMENTS,
Naval Ordnance Lab White Oak Md
Jack R. Dixon. 1Feb 67, 55p Rept no. NOLTR-67-16

Descriptors: (*Carriers (Semiconductors), Infrared phenomena), (*Semiconductors, Reflectivity), Test methods, Reviews, Optical properties, Electrical properties, Band theory of solids.

Methods are reviewed by which free carrier effective masses of semiconductors are determined from measurements of the infrared reflectivity at normal incidence. This effective mass is referred to as the electric susceptibility mass, (m sub s). The theory upon which the measurements are based is developed. Relationships between (M sub s) and various types of electronic band structure are discussed in considerable detail. Several examples are presented which illustrate the usefulness of such measurements in studying the basic electronic properties of semiconductors. (Author)
AD-650 867 HC$3.00 MF$0.65

MICROWAVE RESEARCH.
Stanford Univ Calif Microwave Lab
For primary bibliographic entry see Field 20E.
AD-650 971 HC$3.00 MF$0.65

CURRENT INSTABILITIES IN PIEZOELECTRIC SEMICONDUCTORS.
Technical rept.,
Stanford Univ Calif Microwave Lab
W. H. Haydl. Mar 67, 207p Rept no. ML-1517
Contract Nonr-225 (48)

Descriptors: (*Semiconductors, Piezoelectric crystals), Electric currents, Carriers (Semiconductors), Acoustics, Cadmium sulfides, Oscillation, Stability, Theory, Interactions.

The report describes the discovery of 'square-wave' type current oscillations and the traveling high electric field domains in cadmium sulfide. Numerous experiments were performed to determine the behavior of the traveling domain, the oscillation conditions and important parameters. Experimental results lead to the conclusion that both current saturation and current oscillations as observed are due to amplification of the shear wave components of thermal acoustic noise. A simple linear theory which predicts the occurrence of current oscillations in piezoelectric semiconductors has been developed. The saturation of the sample current is also treated theoretically. Good agreement with experimental results is obtained with both theories. The effect of the current saturation and the oscillations on the amplification of an acoustic signal is discussed. Theory indicates that the maximum possible acoustic gain is of the order of 75-100 dB. (Author)
AD-651 003 HC$3.00 MF$0.65

DEPOSITION OF CARBON ON DIAMOND SEED CRYSTALS,
Case Inst of Tech Cleveland Ohio
For primary bibliographic entry see Field 20B.
AD-651 059 HC$3.00 MF$0.65

SOLID STATE RESEARCH: 1967:1.
Quarterly rept., 1 Nov 66-31 Jan 67,
Massachusetts Inst of Tech Lexington Lincoln Lab
Alan L. McWhorter. 15 Feb 67, 59p
ESD-TR-67-162
Contract AF 19 (628)-5167
See also AD-647 688.

Descriptors: (*Solid state physics, Reviews), (*Lasers, Solid state physics), (*Materials, Solid state physics), (*Semiconductor devices, Solid state physics), Semiconductors, Infrared detectors, Crystal growth, Band theory of solids, X-ray diffraction analysis, Magnetism, Magneto-optic effect, Single crystals, Phase studies, Physical properties, Semiconducting films.

The report covers in detail the solid state research work at Lincoln Laboratory for the period 1 November 1966 through 31 January 1967. The topics covered are Solid State Device Research, Optical Techniques and Devices, Materials Research, and Physics of Solids. (Author)
AD-651 065 HC$3.00 MF$0.65

FUNDAMENTALS OF MAGNETISM IN METALS. CHAPTER 10,
Yeshiva Univ New York Belfer Graduate School of Science
Daniel C. Mattis. 1966, 18p
AFOSR-67-0930
Grant AF AFOSR-1075-66
Availability: Published in Proceedings Symposium Physics Metals Chicago Oct 1966 American Society of Metals p189-225.

Descriptors: (*Magnetism, *Metals), (*Solid state physics, *Symposia), Ferromagnetism, Fermions, Resistance (Electrical), Superconductors, Quantum mechanics, Theory, Magnetic moments, Phase shift, Magnetic alloys, Magnetic properties, Electrons, Antiferromagnetism, Low-temperature research, Density.

A review of current knowledge on the dilute magnetic alloys, with emphasis on anomalous low temperature properties. (Author)
AD-651 120 Not available from CFSTI.

SEMIANNUAL PROGRESS REPORT COVERING PERIOD JULY 1, 1966-DECEMBER 31, 1966.
Harvard Univ Cambridge Mass Div of Engineering and Applied Physics
Mar 67, 83p
Contracts Nonr-1866 (16), Nonr-1866 (07)
Research supported in part by USAF, ARPA, NSF, and NASA. See also AD-646 087.

Descriptors: (*Solid state physics, Scientific research), (*Information theory, Scientific research), (*Control systems, Scientific research), (*Electromagnetic waves, Propagation), Very low frequency, Automatic, Electronics, Systems engineering, Lasers, Ferromagnetic materials, Antennas, Ferroelectric materials, Plasma medium, Raman spectroscopy, Microwave frequency, Wave transmission.

Contents: Very low frequency propagation; Electron and solid state physics; Automatic control: Systems Analysis and control; Automatic control; Information and control processes; Topics in automatic control; Communications and networks: Electronics and communications; Communications theory. Microwave application of ferromagnetic and ferroelectric materials. Electromagnetic phenomena: Antennas; Coupled antennas and arrays; Antennas and waves in dielectric conducting and plasma media.
AD-651 121 HC$3.00 MF$0.65

MAGNETIC RELAXATION IN CRYSTALS.
Washington Univ Seattle
For primary bibliographic entry see Field 20H.
AD-651 133 HC$3.00 MF$0.65

RESEARCH IN PURIFICATION AND SINGLE CRYSTAL GROWTH OF II-VI COMPOUNDS.
Quarterly progress rept., no. 7, 15 Oct 66-14 Jan 67,
Eagle-Picher Industries Inc Miami Okla Miami Research Labs
R. H. Fahrig, L. W. Brown, and G. N. Webb. 1967, 31p
Contract AF 33 (615)-2947
See also AD-642 450.

Descriptors: (*Semiconductors, Preparation), (*Crystal growth, Semiconductors), (*Single crystals, Purification), (*Cadmium compounds, Crystal growth), (*Zinc compounds, Crystal growth),

Impurities, Mass spectroscopy, Solid solutions, Cadmium sulfides, Zinc sulfides, Selenides, Absorption spectrum, Emissivity, Doping, Optical properties, Crystal lattice defects.
Identifiers: Zinc selenide.

Cadmium sulfide and zinc selenide were synthesized. Impurities present in these and in zinc sulfide were determined by mass and emission spectrography and by the atomic absorption method. Purities of the zinc compounds are generally lower than that of the CdS. The growth of crystals of II-VI compounds from the melt was continued. A number of custom doped crystals of ZnS, ZnSe, and mixtures of the two were grown. The light transmission characteristics of a ZnSe specimen were determined from a spectrophotometric plot. The crystal slice used for a window in this experiment, exhibited a pattern of interesting imperfections from which some of the crystal growth conditions might be deduced. Cadmium sulfide crystals were grown routinely by the method of vapor phase deposition.
AD-651 140 HC$3.00 MF$0.65

OPTICAL PROPERTIES OF EXPITAXIAL PbS FILMS IN THE ENERGY RANGE 2-6 eV.
Technical rept.,
Harvard Univ Cambridge Mass Gordon Mckay Lab
Charles E. Rossi. Jan 67, 35p Rept no. TR-HP-17
ARPA-TR-28
Contracts Nonr-1866 (10), SD-88

Descriptors: (*Semiconducting films, Optical properties), (*Lead compounds, Sulfides), Films, Epitaxial growth, Reflectivity, Electron diffraction analysis, Light transmission.
Identifiers: Lead sulfide.

The reflectivity of epitaxial PbS films was compared with the reflectivity of bulk PbS in the energy range 2.1 to 6.2 eV and found to agree in both magnitude and structure within a few percent at energies where interference effects can be neglected. The transmission of several films with thicknesses varying from 335 A to 550 A has been measured and the structure and shape of the spectra shown to be the same for the films with different thicknesses. The reflectivity of bulk PbS between 2.1 and 6.2 eV has been combined with measurements made by other workers outside of this range to compute optical constants from the Kramers Kronig relation. The optical constants obtained in this manner appear to agree quite well with those obtained from the reflectivity and transmission of the films, considering the experimental difficulties experienced in measuring film thickness and the absolute magnitude of the reflectivity. (Author)
AD-651 215 HC$3.00 MF$0.65

CRYSTAL CHEMISTRY OF DEFECTIVE STRUCTURES IV - CHANGE OF A P-TYPE SEMICONDUCTOR INTO A N-TYPE SEMICONDUCTOR BY VAPOR TREATMENT.
Technical rept.,
Pennsylvania State Univ., University Park.
W. Capps, and W. A. Weyl. Jan 51, 8p TR-27
Contract N6onr-269 (00)

Descriptors: (*Semiconducting films, Substitution reactions), (*Crystal Lattice defects, Chemical properties), Copper compounds, Oxides, Films, Hydrochloric acid, Chlorides, Vapors, Transistors, Printed circuits.
Identifiers: Cuprous oxide.

Cuprous oxide, Cu20, which has grown on metallic copper by low temperature oxidation, represents a P-type semiconductor. The substitution method which was described previously in detail made it possible to change this cuprous oxide into a N-type semiconductor by exposing it to HC1 or CuC12 vapor at 300C. The suitability of such an anion substitution (replacing an occasional 02- ion by a C1- ion) should be investigated by producing transistors. The method may lend itself to the printed circuit technique, because no high temperatures are involved. (Author)
ATI-125 138 HC$3.00

A NEW EFFECT IN THE LOW MAGNETIC FIELD ULTRASONIC ATTENUATION OF IMPURE SUPERCONDUCTING NIOBIUM.
Westinghouse Electric Corp., Pittsburgh, Pa. Research Labs.
M. Gottlieb, and C. K. Jones. 10 Nov 66, 10p
NASA-TM-X-83423
Supported in Part By Nasa Its Sci. Paper No. 66-9jo-phony-p2

Descriptors: *Acoustic attenuation, *Niobium, *Superconductor, *Ultrasonics, Acoustic, Attenuation, Crystal, Field, Frequency, Impurity, Magnetic, Physics, Solid, State, Wave.

For abstract, see STAR 05 11.
N67-22473 HC$3.00 MF$0.65

THE "BLEACHING" EFFECT IN ZN S/ CO/ CRYSTALS UNDER THE INFLUENCE OF EXTREMELY LARGE PULSES OF A RUBY LASER.
Effekt "prosvetleniya" V Kristallakh Zn s/ Co Pod Deystviyem Gigantskikh Impul'sov Rubinovogo Opticheskogo Kvantovogo Generatora
National Aeronautics and Space Administration, Washington, D. C.
L. N. Galkin. Apr 67, 8p NASA-TT-F-480
Transl. Into English From Dokl. Akad. Nauk Sssr (Moscow), V. 170, No. 2, 1966 P 315-316

Descriptors: *Cobalt, *Pulsed laser, *Ruby laser, *Zinc sulfide, Crystal, Doping, Excitation, Ion, Laser, Pulse, Relaxation, Ruby, Sulfide, Transition, Zinc.

For abstract, see STAR 05 11.
N67-22838 HC$3.00 MF$0.65

ATOMIZING OF SOLID BODIES BY ION BOMBARDMENT.
Zerstaeubung Von Festkoerpern Durch Ionenbeschuss
Kernforschungsanlage, Juelich (West Germany). Institut Fuer Reaktorwerkstoffe.
K.-T. Rie. Sep 65, 58p JUL-304-RW
in German

Descriptors: *Atomization, *Ion bombardment, *Metal surface, *Solid state physics, Atom, Bombardment, Cadmium, Crystal, Emission, Energy, Gold, Impact, Ion, Metal, Orientation, Penetration, Physics, Silver, Single, Solid, State, Structure, Surface.

For abstract, see STAR 05 11.
N67-22901 HC$3.00 MF$0.65

20M. THERMODYNAMICS

THERMODYNAMIC AND COMPOSITION DATA FOR CONSTANT-VOLUME COMBUSTION OF STOICHIOMETRIC MIXTURES OF HYDROGEN-OXYGEN DILUTED WITH HELIUM OR HYDROGEN,
Toronto Univ. (Ontario). Inst. for Aerospace Studies.
For primary bibliographic entry see Field 21B.
AD-455 747 HC$3.00 MF$0.65

MASS-SPECTROMETRIC STUDY OF THE THERMODYNAMIC PROPERTIES OF Zr-F SPECIES,
Philco-Ford Corp Newport Beach Calif Aeronutronic Div
For primary bibliographic entry see Field 7D.
AD-650 657 Not available from CFSTI.

THE THERMODYNAMIC PROPERTIES OF THE ALUMINUM SILICATES.
Chicago Univ Ill
For primary bibliographic entry see Field 8G.
AD-650 749 Not available from CFSTI.

SOME ASPECTS OF THERMAL MODEL TESTING IN SPACE CHAMBERS.
Arnold Engineering Development Center Arnold Air Force Station Tenn
For primary bibliographic entry see Field 22B.
AD-650 814 HC$3.00 MF$0.65

REAL GAS EFFECTS IN HYPERSONIC AERODYNAMIC HEATING.
Texas Univ Austin Defense Research Lab 4410
For primary bibliographic entry see Field 20D.
AD-650 984 HC$3.00 MF$0.65

SYMPOSIUM ON INTERDISCIPLINARY ASPECTS OF RADIATIVE ENERGY TRANSFER.
General Electric Co Philadelphia Pa Missile and Space Div
For primary bibliographic entry see Field 20F.
AD-651 048 HC$3.00 MF$0.65

RESEARCH ON NON-EQUILIBRIUM STATISTICAL PHYSICS.
Final rept.,
Brussels Univ (Belgium) Faculte des Sciences
I. Prigogine. 31 Oct 66, 31p
AFOSR-67-0927
Grant AF-EOAR-52-64

Descriptors: (*Statistical mechanics, Physics), (*Kinetic theory, Equations), Relativity theory, Entropy, Thermodynamics, Gravity, Plasma physics, Hydrodynamics, Cerenkov radiation.

The research covered by the present report ranges over a large variety of topics. The introduction of a quasi-particle description has been shown to lead to a great formal simplification of the generalized kinetic equations, and of the expression for the non-equilibrium entropy; specific systems studied include anharmonic solids, classical gases, plasmas and many-fermion systems. The general relation between the equilibrium Gibbs definition and the non-equilibrium Boltzmann definition of entropy has been elucidated, and the resulting picture departs quite radically from the disorder or information theory image of entropy. The study of gravitational systems has led to a new type of long time evolution equation with interesting properties. The theory of unstable plasmas has been extended to the inhomogeneous case, and to situations with an external magnetic field. Further progress in plasma physics bears on the study of the generalized dielectric constant and of Cerenkov radiation. The hydrodynamical equations for a relativistic system have been derived from a statistical description, and exhibit novel features. Of particular significance is the progress achieved in setting up a covariant formulation of relativistic statistical mechanics. Finally the thermodynamical theory of the local potential has been applied to the study of the Soret effect, and has been extended to include the stability analysis of simple kinetic equations. (Author)
AD-651 069 HC$3.00 MF$0.65

EXPERIMENTAL INVESTIGATION OF INFLUENCE OF TURBULENCE OF FLOW ON HEAT EXCHANGE DURING MOTION OF AIR IN PIPES.
Foreign Technology Div Wright-Patterson AFB Ohio
I. T. Shvets, E. P. Dyban, M. V. Stradomskii, and E. Ya. Epik. 17 Mar 67, 23p Rept no. FTD-MT-65-367
TT-67-61677

Group 20M — Thermodynamics

Eksperimentalnoe Issledovanie Vliyaniya Turbulentnosti Potoka na Teploobmen pri Dvizhenii Vodukha v Trubakh, edited machine trans. of Teploi Massoperenos (USSR) v3 p370-81 1963.

Descriptors: (*Heat transfer, *Turbulence), Gas flow, Air, Pipes, Friction, Motion, Reynolds number, USSR.

Experiments were conducted on study of heat exchange during motion of air in relatively short pipes in range of Reynolds numbers 1,000 to 50,000 with consideration of initial turbulence of flow. Experimental material was a segment of EYalT steel seamless pipe with internal diameter 51mm, wall thickness 1.5mm, and 4,000mm length. Conditions for experiment are described in detail. Results of experiments were processed to obtain dependence of average and local Nusselt number on Reynolds number at different sections of pipe for different magnitudes of Karman number.
AD-651 087 HC$3.00 MF$0.65

JOURNAL OF ENGINEERING PHYSICS: SELECTED ARTICLES, 1964, VOL. 7, NO. 9.
Foreign Technology Div Wright-Patterson AFB Ohio
17 Mar 67, 67p Rept no. FTD-MT-65-329
TT-67-61680
Edited machine trans. of Inzhenerno-Fizicheskii Zhurnal (USSR) v7 n9 p25-9, 38-43, 64-77, 83-91, 102-7 1964.

Descriptors: (*Thermodynamics, Scientific research), (*Aerodynamics, Scientific research), (*Fluid mechanics, Scientific research), Gas flow, Heat transfer, Pipes, Elasticity, Cylindrical bodies, Structural shells, Thermal conductivity, Vortices, Stability, Liquids, USSR.

Contents: Calculation of process of evacuation of a gas volume, by N. P. Belik, N. M. Belyayev, and G. S. Shandorov; Heat exchange between a moving dispersed medium and the wall of a pipe, by V. I. Malyukevich; Non-stationary problems of thermoelasticity for a plate and a cylindrical shell, by V. F. Kolesov; Solution of non-homogeneous equation of thermal conduction for multilayered bodies, by P. Ye. Bulavin and V. M. Kashcheyev; Block diagrams of measurements of parameters of flows with the help of thermistors, by A. G. Shashkov; Influence of temperature conditions on stability of rotational motion of a liquid, by S. K. Aslanov; Concerning the use of two-phase systems as a thermodynamic working medium, by I. T. El'perin and V. A. Minkov.
AD-651 090 HC$3.00 MF$0.65

THERMODYNAMIC PROPERTIES OF LIQUID WATER TO ONE KILOBAR.
Naval Ordnance Lab White Oak Md
William A. Walker. 30 Jan 67, 80p Rept no. NOLTR-66-217

Descriptors: (*Water, *Thermodynamics), Volume, Compressive properties, Specific heat, Enthalpy, Entropy, Free energy, High-pressure research, Thermal expansion, Joule-Thomson effect, Energy, Tables.

Recent accurate experimental P-v-t data for pure liquid water, in the range 0 to 1000 bars and 0 to 150C, are combined with other data at P = 1 atmosphere and on the saturation line, to get the thermodynamic functions for liquid water throughout this range. Tables in c.g.s. units of v, E, H, S, Gibbs function, Helmholtz function, Cp, Cv, volume expansivity, isothermal compressibility, adiabatic compressibility, and Joule-Thompson coefficient are presented for 17 isotherms, with pressure increments of 20 bars. (Author)
AD-651 105 HC$3.00 MF$0.65

INFRARED RADIATIVE HEAT TRANSFER IN NONGRAY GASES.
Interim technical rept., 15 Aug 65-15 Sep 66,
State Univ of New York Stony Brook Coll of Engineering
R. D. Cess, P. Mighdoll, and S. N. Tiwari. Jan 67, 43p
ARL-67-0015
Contract AF 33 (615)-3104

Descriptors: (*Infrared radiation, *Heat transfer), (*Diatomic molecules, Spectra (Infrared)), Gases, Band spectrum, Emissivity, Absorption spectrum, Carbon monoxide, Temperature, Distribution.

The object of the investigation was to study various approximate methods of analyzing infrared radiative heat transfer in nongray nonisothermal gases. For this purpose, a very simple physical system was chosen, and this consists of a gas bounded by two infinte parallel black plates having the same uniform temperature. There is a uniform heat source (or sink) within the gas. Furthermore, attention was restricted to gases having a single fundamental vibration-rotation band, such that the results are quantitatively applicable only to diatomic gases. The qualitative conclusions, however, apply to any gas which radiates in the infrared. It is found that for intermediate optical thicknesses, the line structure of the vibration-rotation band can have a significant effect upon the temperature distribution within the gas. Predictions based on the gray gas assumption are shown to be greatly in error. It is further illustrated that one cannot apply the optically thick limit to an entire vibration-rotation band, since there will always be an optically non-thick region in the band wings, and such regions will contribute significantly to the radiative transfer process. (Author)
AD-651 218 HC$3.00 MF$0.65

QUANTUM MECHANICAL CALCULATIONS OF THE SECOND VIRIAL COEFFICIENTS FOR HYDROGEN.
National Bureau of Standards, Washington, D. C.
For primary bibliographic entry see Field 20J.
NBS-TN-412 HC$0.15 MF$0.65

THERMAL RADIATION PROPERTY MEASUREMENT TECHNIQUES.
National Bureau of Standards, Washington, D. C. Inst. for Basic Standards.
For primary bibliographic entry see Field 14B.
NBS-TN-415 HC$0.50 MF$0.65

NON-STATIONARY HEAT AND MASS TRANSFER.
Israel Program for Scientific Translations, Ltd., Jerusalem.
I. G. Gurevich, N. G. Kondrashov, and I. P. Zhuk. 1967, 163p NASA-TT-F-432, TT-67-51368
Transl. into English of the Book "voprosy Nestatsionarnogo Perenosa Tepla I Massy" Minsk. Akad. Nauk Belorussk. Ssr, 1965 Published for Nasa and Nsf

Descriptors: *Heat transfer, *Mass transfer, *Numerical analysis, Air, Analysis, Calculation, Convection, Exchanger, Flow, Heat, Kinetics, Mass, Nonstationary, Numerical, Separation, Soret coefficient, State, Thermodynamics, Transfer, U.S.S.R., Unsteady.

For abstract, see STAR 05 11.
N67-22041 HC$3.00 MF$0.65

SURVEY OF DETECTORS AND DYNAMIC CALIBRATION METHODS FOR REMOTE SENSING SYSTEMS.
IIT Research Inst., Chicago, Ill.
For primary bibliographic entry see Field 14C.
For abstract, see STAR 05 11.
N67-22779 HC$3.00 MF$0.65

EVALUATION OF HRL CONDENSING TEMPERATURE CONTROLS.
Aerojet-general Corp., Azusa, Calif.
E. F. Perez, and W. W. Tingle. 19 Jun 64, 36p
NASA-CR-72217, TM-340-64-1-234

Descriptors: *Condenser, *Flow characteristics, *Pump, *Radiator, *Temperature control, Bypass, Characteristics, Control, Density, Evaluation, Flow, Loop, Potassium, Sodium, Temperature.

For abstract, see STAR 05 11.
N67-22846 HC$3.00 MF$0.65

CYLINDRICAL RADIATOR WITH INTERNAL HEAT REJECTION.
Aerojet-general Corp., Azusa, Calif.
For primary bibliographic entry see Field 18N.
For abstract, see STAR 05 11.
N67-22857 HC$3.00 MF$0.65

HEAT EXCHANGE WITH BOILING CARBON DIOXIDE AT NEAR-CRITICAL PRESSURES.
Teploobmen S Kipyashchei Dvuokis'yu Ugleroda Pri Davleniakh Blizkikh K Kriticheskomu
Gt. Brit. Ministry of Aviation, London.
G. P. Nikolaev, and V. P. Skripov. Jan 67, 9p
TIL/T-5682
Transl. Into English From Izv. Vyssh. Ucheb. Zaved., Energ. (Minsk), V. 4, 1964 P 66-71

Descriptors: *Boiling, *Carbon dioxide, *Critical pressure, *Free convection, *Heat transfer, Convection, Critical, Flux, Free, Heat, Pressure, Thermocouple, U.S.S.R.

For abstract, see STAR 05 11.
N67-22962 HC$3.00 MF$0.65

IONOSPHERIC PREDICTIONS FOR MARCH 1967.
National Physical Lab., New Delhi (India).
For primary bibliographic entry see Field 17B.
For abstract, see STAR 05 11.
N67-22967 HC$3.00 MF$0.65

THEORETICAL STUDY OF NATURAL CONVECTION FLOWS IN CLOSED-END CYLINDRICAL VESSELS FINAL REPORT.
Denver Research Inst., Colo.
C. W. Chiang. 20 Mar 67, 36p NASA-CR-83528, DRI-2389
Grant NSG-518

Descriptors: *Convective flow, *Cylindrical tank, *Free convection, *Laminar flow, *Steady state flow, Boundary, Closed, Convection, Cylinder, Displacement, Distribution, End, Flow, Free, Laminar, Rayleigh number, Solution, State, Steady, Tank, Temperature, Theory, Velocity, Vessel.

For abstract, see STAR 05 11.
N67-23254 HC$3.00 MF$0.65

PROGRAMS FOR COMPUTING EQUILIBRIUM THERMODYNAMIC PROPERTIES OF GASES.
National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
H. E. Bailey. Apr 67, 23p NASA-TN-D-3921
Contract 129-01-08-20

Descriptors: *Computer program, *Diatomic gas, *Gas mixture, *Thermodynamic property, Computer, Concentration, Density, Diatomic, Equilibrium, Fortran, Gas, Mixture, Program, Property, Temperature, Thermodynamic.

For abstract, see STAR 05 11.
N67-23300 HC$3.00 MF$0.65

QUALITATIVE EFFECTS ON SAFETY AND CONSTRUCTION MATERIALS OF 1300 DEG F SODIUM-POTASSIUM SPRAY IN AIR AND NITROGEN.
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
A. S. Asadourian, and J. M. Mc Gee. Apr 67, 28p
NASA-TM-X-1365
Contract 701-04-00-02-22

Descriptors: (*Fire control, *Nonflammable material, *Potassium, *Sodium, Air, Asbestos, Atmosphere, Burn, Chromate, Control, Evaluation, Fire, Leather, Material, Nitrogen, Protection, Resistance, Rubber, Shielding, Spray.

For abstract, see STAR 05 11.
N67-23334 HC$3.00 MF$0.65

OPTIMISATION DES DESCENTES DE COURANT DANS DES ENCEINTES CRYOGENIQUES (Optimum Input Leads for Cryogenic Apparatus),
Commissariat a l'Energie Atomique, Saclay (France). Centre d'Etudes Nucleaires.
For primary bibliographic entry see Field 14B.
PB-174 579 HC$3.00 MF$0.65

20N. WAVE PROPAGATION

GENERAL RESEARCH IN DIFFRACTION THEORY, VOLUME I,
Lockheed Missiles and Space Co., Sunnyvale, Calif.
For primary bibliographic entry see Field 20F.
AD-241 228 HC$3.00

TABLES OF SPHEROIDAL WAVE FUNCTIONS. PART 2 - PROLATE RADIAL FUNCTIONS OF THE FIRST AND SECOND TYPE,
Naval Research Lab Washington D C
For primary bibliographic entry see Field 12A.
AD-650 575 HC$3.00 MF$0.65

THEORETICAL STUDY OF THE PROPAGATION OF INTRASONIC WAVES IN THE ATMOSPHERE.
Avco Corp Wilmington Mass Avco Space Systems Div
For primary bibliographic entry see Field 20A.
AD-650 752 HC$3.00 MF$0.65

ATTENUATION OF MILLIMETER WAVELENGTH RADIATION BY GASEOUS WATER,
Atmospheric Sciences Lab White Sands Missile Range N Mex
James T. Hall. Jan 67, 45p
ECOM-5097

Descriptors: (*Millimeter waves, Attenuation), (*Water vapor, Absorption), Electromagnetism, Submillimeter waves.

A theoretical computation for absorption by water vapor of radiation within the millimeter and submillimeter region of the electromagnetic spectrum permits the determination of attenuation coefficients for given water vapor densities, pressures and temperatures. The rigid asymmetrical top rotor approximation for all angular momentum quantum numbers J < or = 12 is used with the Zhevaklin-Naumov line shape and half-widths calculated by Anderson's theory. An equation is given for extrapolating attenuation coefficients to pressures and temperatures other than those for which calculations were performed. (Author)
AD-650 812 HC$3.00 MF$0.65

LF AND VLF REFLECTION LOSS IN THE LOWER IONOSPHERE: A THEOREM ON ABSORPTION AND ITS APPLICATION,
Rand Corp Santa Monica Calif
H. G. Booker, and C. M. Crain. Mar 67, 35p Rept no. RM-5249-PR
Contract F44620-67-C-0045
See also AD-650 819.

Descriptors: (*Ionospheric propagation, Attenuation), Radio transmission, Radio waves, Theorems, Low frequency, Very low frequency, Absorption, Nuclear explosions, Reflection.

Two simple practical methods are given for determining the transmission loss of LF and VLF radio waves obliquely reflected from the lower ionosphere in a nuclear burst environment. The constant K, given in RM-4031-PR, is recalculated and found to equal pi, not 2. A theorem, based on full wave theory, is derived that extends results for a nonabsorbing medium to an absorbing medium with minimum complexity. The assumption is made that in the reflecting stratum, the permittivity profile is exponential. At the height where the level of reflection of the upgoing wave is expected to maximize (by the Field-Engel standard), the authors fit an exponential profile and apply to it their analytical expression for attenuation on reflection. Results are corrected as necessary by application of the nondeviating region technique to take account of attenuation below the reflection level. A remarkably accurate alternative method, the phase-integral procedure, combines the two steps. Both methods can be applied with sufficient accuracy for transmission frequencies as low as 10 kHz without use of computers or elaborate codes. (Author)
AD-650 818 HC$3.00 MF$0.65

ECONOMICAL METHODS FOR CALCULATING LF AND VLF IONOSPHERIC ATTENUATION BASED ON WAVE THEORY,
Rand Corp Santa Monica Calif
C. M. Crain, and H. G. Booker. Mar 67, 23p Rept no. RM-5296-PR
Contract F44620-67-C-0045
See also AD-650 818.

Descriptors: (*Ionospheric propagation, Attenuation), Radio transmission, Low frequency, Very low frequency, Theory, Nuclear explosions, Absorption, Reflection.

A companion Memorandum to RM-5249-PR, AD-650 818 'LF and VLF Reflection Loss in the Lower Ionosphere: A Theorem on Absorption and Its Application,' demonstrating the usefulness of its methods. An analysis is made of a National Bureau of Standards publication in which L. A. Berry compared different methods of calculating the transmission loss caused by nuclear detonation, including the 1964 Crain and Booker method (RM-4031). The cases used in Berry's comparison were recalculated by the improved Booker-Crain method of RM-5249, in which an empirical constant was refined, and an alternative procedure from the same Memorandum was used to check the results. For profiles usually encountered in a nuclear environment the methods are reliable and economical, but care should be taken in applying them to profiles that are not basically exponential in character. (Author)
AD-650 819 HC$3.00 MF$0.65

ELECTROMAGNETIC INTERFERENCE MEASUREMENT METHODS - SHIELDED ENCLOSURE.
Quarterly rept. no. 2, 1 Sep-30 Nov 66,
Georgia Inst of Tech Atlanta Engineering Experiment Station
William R. Free, Charlton H. Bonham, Robert E. Gibson, John H. Gutzke, and Bernard M. Jenkins. Apr 67, 41p Rept no. 34
ECOM-02381-2
Contract DA-28-043-AMC-02381 (E)
See also AD-647 905.

Descriptors: (*Electromagnetic shielding, Antennas), (*Radiofrequency interference, Measurement), Microwave frequency, Ultrahigh frequency, Theory, Conical antennas, Helical antennas, Log periodic antennas, Communication equipment, Army equipment, Antenna radiation patterns.

During the period covered by this report, investigations of techniques and procedures for making radiation measurements in shielded enclosures which can be correlated with open-field measurements have continued. The primary objective of this program is to develop a capability for determining the case radiation and susceptibility characteristics of U. S. Army communication equipments in the controlled environments of shielded enclosures. A microwave hooded antenna capable of making the desired measurements in a shielded enclosure over the frequency range from 1 to 12 GHz has been developed and evaluated. Techniques for calibrating this probe antenna have been investigated during this period and are described in detail. A UHF hooded antenna, for use over the frequency range from 200 to 1500 MHz, has also been developed. The evaluation of this probe antenna has continued during this period and the results obtained to date are presented. Theoretical and experimental investigations of the field distribution within a shielded enclosure at low frequencies are discussed. (Author)
AD-650 830 HC$3.00 MF$0.65

IONOSPHERIC REFRACTION EFFECTS ON THE DOPPLER SHIFT OF RADIO TRANSMISSIONS FROM ARTIFICIAL EARTH SATELLITES.
Technical rept.,
Texas Univ Austin Defense Research Lab 4410
Joseph Frank Willman. Aug 62, 74p Rept no. DRL-487
Contract NOrd-16498
Prepared in cooperation with Johns Hopkins Univ., Silver Spring, Md., Applied Physics Lab., CF-2993.

Descriptors: (*Ionospheric propagation, Doppler effect), Satellites (Artificial), Refraction, Radio transmission, Electron density, Ionosphere, Doppler systems, Tracking, Doppler navigation, Errors, Navigation satellites.
Identifiers: Transit.

It is shown that ionospheric contributions to the received Doppler shift may be expressed in terms of powers of the inverse of the transmission frequency, where the first, second, and third order terms are of significance. The origin of each of these refraction errors is discussed. Faraday rotation is shown to be closely related to the second order ionospheric refraction error. A theoretical ionospheric refraction error computation program was instrumented on an IBM 1620 digital computer. For a spherically symmetrical ionosphere, results of the theoretical error computation are presented and these results indicate that the magnitude of the third order ionospheric refraction error may be considerably greater than that of the second order errors. Four-frequency Doppler data received from TRANSIT satellites at TRANSIT Station 002 in Austin, Texas, were analyzed in order to determine the frequency dependence of the measured ionospheric refraction error. Some interesting results of ionospheric refraction error measurements from TRANSIT IV-A data are presented and discussed. A theoretical distribution function which may be used to extrapolate ionosphere vertical radio sounding data to heights above h sub max, the height of maximum electron density of the F2 region, is presented. Models of electron density distribution for the upper ionosphere are presented and compared. (Author)
AD-650 985 HC$3.00 MF$0.65

MEASUREMENT OF THE DIELECTRIC CONSTANT OF ALUMINUM OXIDE.

Texas Univ Austin Defense Research Lab 4410
For primary bibliographic entry see Field 11B.
AD-651 005 HC$3.00 MF$0.65

ELECTROMAGNETIC MEASUREMENTS OF ACCELERATION.
Interim rept.,
Utah Univ Salt Lake City Upper Air Research Labs
D. K. Gehmlich. Nov 66, 36p Rept no. Scientific-2, UU66-12
AFCRL-66-799
Contract AF 19 (628)-4055

Descriptors: (*Electromagnetic properties, *Measurement), (*Acceleration, Measurement), Accelerometers, High altitude, Friction, Rockets, Instrumentation, Diagrams, Drag, Design.

The most common types of accelerometers are examined to determine their suitability for measuring drag accelerations in the falling sphere air density experiment. Only those types having no mechanical friction can detect the low drag accelerations encountered at high altitudes. One type of frictionless accelerometer, having electromagnetic suspension, is considered in some detail. The ultimate goal is the development of a three-axis accelerometer with a single, spherical proof-mass common to all three axes which can detect drag accelerations down to 0.00001 or 0.000001 g. (Author)
AD-651 161 HC$3.00 MF$0.65

LASER DAMAGE: A SELECTED LITERATURE SURVEY.
Air Force Cambridge Research Labs L G Hanscom Field Mass
For primary bibliographic entry see Field 20E.
AD-651 210 HC$3.00 MF$0.65

IONOSPHERIC PREDICTIONS FOR MAY 1967.
National Physical Lab., New Delhi (India). Radio Propagation Unit.
Dec 66, 4p RRC-B128

Descriptors: *Critical frequency, *Ionospheric propagation, *Radio frequency, Critical, East, Frequency, Hemisphere, Ionospheric, Nomograph, Prediction, Propagation, Radio, Ray.

For abstract, see STAR 05 11.
N67-22899 HC$3.00 MF$0.65

ANNUAL REPORT 1965-1966.
Council for Scientific and Industrial Research, Pretoria (South Africa). National Inst. for Telecommunications Research.
For primary bibliographic entry see Field 3B.
For abstract, see STAR 05 11.
N67-22950 HC$3.00 MF$0.65

IONOSPHERIC PREDICTIONS FOR FEBRUARY 1967.
National Physical Lab., New Delhi (India).
For primary bibliographic entry see Field 17B.
For abstract, see STAR 05 11.
N67-22968 HC$3.00 MF$0.65

A THREE-DIMENSIONAL RAY TRACING COMPUTER PROGRAM.
Technical rept.,
Institutes for Environmental Research, Boulder, Colo.
R. M. Jones. Dec 66, 112p ITSA-17
IER-17

Descriptors: (*Computer programs, *Ionospheric propagation), (*Radio transmission, Ionosphere), Refractive index, Subroutines, Atmosphere models, Terrestrial magnetism.

An accurate, versatile computer program for tracing rays through a medium whose index of refraction varies in three dimensions is described. The program was developed for tracing rays in the ionosphere. Annotated listings of all routines are included in appendices, along with deck set-ups and descriptions of input data and output. (Author)
PB-174 502 HC$3.00 MF$0.65

QUARTERLY RADIO NOISE DATA SEPTEMBER, OCTOBER, NOVEMBER 1965.
Technical rept.,
Institutes for Environmental Research, Boulder, Colo.
W. Q. Crichlow, R. T. Disney, and M. A. Jenkins. Jan 67, 49p ITSA-18-28
IER-18
See also AD-645 024.

Descriptors: (*Noise (Radio), Data), (*Radiofrequency interference, Data), Atmospherics, Frequency, Measurement, Tables, Power, Voltage.

A number of radio noise recording stations are operated in a program co-ordinated by the Environmental Science Services Administration. Measurement results are given as month-hour and time block median and decile values. The parameters recorded are the noise power expressed in terms of an effective antenna noise factor, fa, and the mean voltage and mean logarithm expressed as deviations, Vd, and Ld, in dB below the average power. No systematic statistical editing of the records has been attempted in this publication. The data should be used, realizing the values given may reflect levels of atmospheric noise, man-made noise, or station interference. These quarterly summaries of radio noise formerly were published as NBS Technical Notes. For continuity of the series, the NBS Technical Notes were numbered 18-1 through 18-26, and the ESSA Technical Report Series starts with 18-27. (Author)
PB-174 530 HC$3.00 MF$0.65

21. PROPULSION AND FUELS

21A. AIR-BREATHING ENGINES

SYMPOSIUM ON PARACHUTE TECHNOLOGY AND EVALUATION, PROCEEDINGS. VOLUME I.
Air Force Flight Test Center, Edwards AFB, Calif.
For primary bibliographic entry see Field 1C.
AD-452 430 HC$3.00

SYMPOSIUM ON PARACHUTE TECHNOLOGY AND EVALUATION, PROCEEDINGS. VOLUME II.
Air Force Flight Test Center, Edwards AFB, Calif.
For primary bibliographic entry see Field 1C.
AD-452 431 HC$3.00

21B. COMBUSTION AND IGNITION

A RESEARCH PROGRAM FOR UNDERSTANDING THE MECHANISMS OF FLAME INHIBITION.
Technical documentary rept., 15 Nov 62-15 Jan 64,
Monsanto Research Corp., Dayton, Ohio.
G. B. Skinner, A. D. Snyder, and G. H. Ringrose. Jan 64, 138p
AFAPL-TDR-64-40
Contract AF 33 (657)-10304

Descriptors: (*Flames, Inhibition), (*Boranes, Flames), Diboranes, Pentaboranes, Combustion, Air, Hydrocarbons, Halogenated Hydrocarbons, Ignition lag, Shock tubes, Flame propagation, Reaction kinetics, Methane, Ethylenes, Bromine compounds, Fluorine compounds.

The effects of inhibitors on the diborane-air and pentaborane-air reactions were studied by measuring flame speeds of borane-air-inhibitor mixtures at low pressures, and by the shock tube technique. The best flame inhibitors were the hydrocarbons and halogenated hydrocarbons which had been found earlier to inhibit hydrogen-air flames. Some of these inhibitors were ineffective in lengthening ignition delays in the shock tube, indicating that a different mechanism may apply in flame propagation than in shock ignition. Detailed kinetic calculations of the effects of CH4, C2H4, CF3Br and C2F4Br2 on the hydrogen-oxygen reaction have yielded values for the rate constants of the reactions whereby these inhibitors remove H atoms from the reacting system. (Author)
AD-435 542 HC$3.00

THERMODYNAMIC AND COMPOSITION DATA FOR CONSTANT-VOLUME COMBUSTION OF STOICHIOMETRIC MIXTURES OF HYDROGEN-OXYGEN DILUTED WITH HELIUM OR HYDROGEN,
Toronto Univ. (Ontario). Inst. for Aerospace Studies.
Andre Benoit. Nov 64, 183p UTIAS-TN-85

Descriptors: (*Combustion products, Thermodynamics), (*Hydrogen, Combustion products), (*Oxygen, Combustion products), (*Helium, Heating), Dissociation, Chemical equilibrium, Computer programs, Nonlinear differential equations, Temperature, Pressure, Molecular weight, Specific heat, Sound, Canada.

The equilibrium thermodynamic properties of the burned gases resulting from complete combustion at constant volume of a hydrogen-oxygen stoichiometric mixture diluted with an excess of hydrogen or helium were computed for a wide range of initial pressures (from 1 to 10,000 atmospheres), assuming no dissipative effects. The dissociations taken into account are H2=2H, O2=2O, OH=O + H, H2O=2H + O and the initial gaseous mixture is taken at room temperature. Outputs are provided for the following quantities: final temperature and final-to-initial temperature ratio, final pressure and final-to-initial pressure ratio, final molecular weight, specific heat at constant pressure of the frozen composition combustion products, frozen composition specific heat ratio of the combustion products, final frozen composition speed of sound, final-to-initial speed of sound ratio, number of moles in burned gases per mole of oxygen in initial mixture, final-to-initial mole number ratio, molar concentration of H2O, OH, H2, O2, H, O and He in the burned gases. Outputs are also provided for the asymptotic values (no dissociation) of the final properties and for the properties of the initial mixture, i.e., its molecular weight, specific heat at constant pressure, specific heat ratio and speed of sound. Results are tabulated and represented graphically for two particular types of dilution, m = 0 (helium dilution) with 0 < or = n < or = 16 and n = 0 (hydrogen dilution) with 0 < or = m < or = 6. The values of m and n are varied in steps of 0.5.
AD-455 747 HC$3.00 MF$0.65

OXYGEN CONCENTRATION AND PRESSURE EFFECTS ON THE IGNITION OF CELLULOSIC FUELS BY THERMAL RADIATION,
Naval Radiological Defense Lab San Francisco Calif
N. J. Alvares. 17 Feb 67, 28p Rept no. USNRDL-TR-67-25
Research supported in part by DASA.

Descriptors: (*Cellulose, *Ignition), (*Thermal radiation, Ignition), Oxygen, Concentration (Chemistry), Pressure, Pyrolysis, Heat transfer, Free radicals, Thermal conductivity.

Measurements of the ignition time and surface temperature, at the time of ignition for cellulosic

fuels in varying atmospheric environments were made in order to help illuminate the mechanism responsible for the spontaneous ignition of these materials exposed to thermal radiation. It was assumed that the mechanism would fall into one of three categories, and these were: (1) A piloted self-ignition, which is dependent in some way upon the temperature of the pyrolyzing solid. (2) A thermal self-ignition which is governed mainly by gaseous heat transfer. (3) A free-radical chain branching self-ignition which should be quite pressure dependent. The varied environmental atmospheric parameters were: (1) Total atmospheric pressure, holding the oxygen concentration constant; (2) oxygen concentration with the total pressure held constant; and (3) the thermal conductivity of the atmospheric environment by use of different diluent gases with both the total pressure and oxygen concentration held constant. Both the surface temperature and ignition response data provide evidence which indicate the thermal self-ignition to be the most likely mechanism responsible for this phenomena. (Author)
AD-650 622 HC$3.00 MF$0.65

A PHALANX FLAME MODEL FOR THE COMBUSTION OF COMPOSITE SOLID PROPELLANTS.
Technical rept.,
Virginia Univ Charlottesville
John B. Fenn. Apr 67, 51p Rept no. PR-114-P
Contract Nonr-3623 (00)
Prepared in cooperation with Princeton Univ., N. J.
Availability: Published in AIAA Journal.

Descriptors: (*Flames, Models (Simulations)), (*Composite propellants, Combustion), (*Solid rocket propellants, Combustion), Burning rate, Solid rocket fuels, Solid rocket oxidizers, Vaporization, Interfaces, Pressure, Diffusion.
Identifiers: Squid project.

A new model for the combustion of composite solid propellants is developed. The flame is represented as burning at the interfacial region between streams of fuel and oxidant which are generated by vaporization of each solid component. The interface between the two solid phases receives the greatest heat flux from the reaction zone and vaporization occurs most rapidly near the interface. The reaction zone is a 'phalanx' which spearheads the attack of hot reaction gases on the solid. The model provides a rational physical explanation for many qualitative observations of solid propellant combustion and successfully correlates the pressure dependence of burning rates. (Author)
AD-650 868 Not available from CFSTI.

INVESTIGATION OF THE WORKING PROCESS IN THE COMBUSTION CHAMBERS OF GAS-TURBINE ENGINES: SELECTED ARTICLES.
Foreign Technology Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 21E.
AD-651 086 HC$3.00 MF$0.65

PERCHLORIC ACID FLAMES. PART IV - METHANE-RICH FLAMES.
Rocket Propulsion Establishment, Westcott (England).
G. S. Pearson. Aug 65, 37p RPE-TR-6516, AD-477254

Descriptors: *Burning rate, *Combustion, *Flame, *Methane, *Perchloric acid, Acid, Atmosphere, Burn, Carbon dioxide, Chlorine, Compound, Gas, Halogen, Hydrocarbon, Kinetics, Mixture, Perchloric, Rate, Reaction, Temperature, Velocity.

For abstract, see STAR 05 11.
N67-22706 HC$3.00 MF$0.65

THE COMBUSTION OF AMMONIUM PERCHLORATE-BASED COMPOSITE PROPELLANTS - A DISCUSSION OF SOME RECENT EXPERIMENTAL RESULTS.
Explosives Research and Development Establishment, Waltham Abbey (England).
J. Powling. 13 Aug 65, 42p ERDE-15/R/65, AD-474311

Descriptors: *Ammonium perchlorate, *Chemical reaction, *Composite propellant, *Gas-solid interface, *Propellant combustion, Ammonium, Catalyst, Chemical, Combustion, Composite, Gas, Heat, Interface, Measurement, Model, Perchlorate, Propellant, Reaction, Release, Solid, Surface, Temperature.

For abstract, see STAR 05 11.
N67-22786 HC$3.00 MF$0.65

SUPERSONIC MIXING OF HYDROGEN AND AIR.
Applied Physics Lab., Johns Hopkins Univ., Silver Spring, Md.
J. H. Morgenthaler. Apr 67, 84p NASA-CR-747
Contract NOW-62-0604-C

Descriptors: *Air current, *Fuel injection, *Gas mixture, *Hydrogen, *Supersonic flow, Air, Current, Data, Diffusion, Effect, Equation, Flow, Fuel, Gas, Injection, Mixture, Parameter, Supersonic, Turbulent.

For abstract, see STAR 05 11.
N67-22859 HC$3.00 MF$0.65

CONCENTRATION MEASUREMENTS OF AN INJECTED GAS IN A SUPERSONIC STREAM.
National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
For primary bibliographic entry see Field 1A.
For abstract, see STAR 05 11.
N67-22862 HC$3.00 MF$0.65

NON-IDEAL DETONATION WITH CONSTANT LATERAL EXPANSION.
Institut Franco-allemand de Recherches, St. Louis (France).
F. Wecken. 29 Jun 65, 30p ISL-T-19/65
Presented At the 4th Symp. on Detonation, White Oak, Md., Oct. 1965

Descriptors: *Detonation, *Differential equation, *Perfect gas, *Steady flow, Conference, Constant, Differential, Equation, Expansion, Flow, Front, Gas, Lateral, Limit, Numerical, Perfect, Reaction, Runge-kutta integration, Shock, Steady, Structure, Zone.

For abstract, see STAR 05 11.
N67-23072 HC$3.00 MF$0.65

PERCHLORIC ACID FLAMES. PART V - ETHYLENE- RICH FLAMES.
Rocket Propulsion Establishment, Westcott (England).
G. S. Pearson. Mar 66, 33p RPE-TR-66/1, PT. V, AD-645817

Descriptors: *Burning rate, *Ethylene, *Perchloric acid, *Premixed flame, Acid, Burn, Chemical, Combustion, Concentration, Flame, Fuel, Kinetics, Oxidizer, Perchloric, Premix, Product, Rate, Reaction.

For abstract, see STAR 05 11.
N67-23126 HC$3.00 MF$0.65

21C. ELECTRIC PROPULSION

INSTRUMENTATION DEVELOPMENT PROGRAM.
Summary rept.,
Arnold Engineering Development Center Arnold Air Force Station Tenn
R. H. Hines, and F. L. Crosswy. Apr 67, 98p
Rept no. AEDC-TR-233
Contract AF 40 (600)-1200
Prepared in cooperation with ARO, Inc., Tullahoma, Tenn.

Descriptors: (*Ion engines, Test equipment), (*Plasma physics, Instrumentation), (*Langmuir probes, Operation), Plasma medium, Probes, Ion beams, Electrons, Temperature, Electron density, Measuring devices (Electrical + electronic), Design.
Identifiers: Plasma probes.

The design and operational characteristics of an in-house-built 5-cm-diam Kaufman-type ion engine that was used to evaluate diagnostic methods is presented. The discharge of the ion engine was investigated and analyzed by employing various types of material probes. The emissive probe was used to determine the beam potential, the electron temperature, and the ion impingement current density. The double Langmuir probe was used to determine electron temperature and ion impingement current density for cross correlation between probes. The analytical and experimental results are compared and discussed. (Author)
AD-650 857 HC$3.00 MF$0.65

AFOSR CONTRACTORS' MEETING ON ION AND PLASMA PROPULSION RESEARCH (10th), APRIL 3-5, 1967, SAN DIEGO, CALIFORNIA.
Special rept. (Abstracts).
General Dynamics/Convair San Diego Calif
5 Apr 67, 47p
AFOSR-67-0894
Contract AF 49 (638)-1556

Descriptors: (*Ion engines, Symposia), (*Plasma engines, Symposia), (*Electric propulsion, Symposia), Plasma generators, Energy conversion, Magnetohydrodynamics, Plasma accelerators, Lasers, Abstracts.

The pamphlet contains the summaries of the papers presented at the Tenth Annual AFOSR Contractors' Meeting on Ion and Plasma Propulsion Research, San Diego, California. The paper deals mostly with basic research on plasma power generation and propulsion. (Author)
AD-651 149 HC$3.00 MF$0.65

L'ELECTROHYDRODYNAMIQUE: UN PROCEDE DE CONVERSION DIRECTE D'ENERGIE A HAUTE TENSION (Electrohydrodynamics: A High-Tension Direct Energy Conversion Process).
Commissariat a l'Energie Atomique, Grenoble (France). Centre d'Etudes Nucleaires.
For primary bibliographic entry see Field 10A.
PB-174 575 HC$3.00 MF$0.65

21D. FUELS

FUEL CELL FUEL STUDIES.
Esso Research and Engineering Co Linden N J Government Research Lab
For primary bibliographic entry see Field 10B.
AD-650 580 HC$3.00 MF$0.65

RESEARCH STUDY ON HEF FIRE FIGHTING.
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
For primary bibliographic entry see Field 13L.
AD-650 982 HC$3.00 MF$0.65

LIQUEFIED NATURAL GAS AS A FUEL FOR SUPERSONIC AIRCRAFT.

National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
R. J. Weber. 1967, 13p NASA-TM-X-52282
Presented At the Am. Gas Assoc. Distribution Conf., St. Louis, 1-4 May 1967

Descriptors: *Jet fuel, *Liquid gas, *Methane, *Supersonic aircraft, Aircraft, Boiling, Capacity, Cost, Design, Engine, Fuel, Gas, Heat, Jet, Liquid, Payload, Performance, Property, Sink, Supersonic.

For abstract, see STAR 05 11.
N67-23315 HC$3.00 MF$0.65

FUTURE MARKET FOR UTILITY COAL IN NEW ENGLAND.
Little (Arthur D.), Inc., Cambridge, Mass.
For primary bibliographic entry see Field 5C.
PB-174 540 HC$3.00 MF$0.65

21E. JET AND GAS TURBINE ENGINES

NOTE ON THE CONCEPT OF BLUNT TRAILING EDGE BLADES.
Von Karman Inst for Fluid Dynamics Rhode-Saint-Genese (Belgium)
For primary bibliographic entry see Field 20D.
AD-650 606 HC$3.00 MF$0.65

INVESTIGATION OF THE WORKING PROCESS IN THE COMBUSTION CHAMBERS OF GAS-TURBINE ENGINES: SELECTED ARTICLES.
Foreign Technology Div Wright-Patterson AFB Ohio
7 Mar 67, 78p Rept no. FTD-MT-65-114
TT-67-61676
Mekhanizm Goreniya Toplivo-Vozdushnoi Smesi v Kamere Gtd na Rezhimakh Predelnogo Obedneniya, edited machine trans. of Aviatsionny Institut, Moscow. Trudy (USSR) n157 p5-16, 51-90 1964.

Descriptors: (*Gas turbines, Combustion chambers), (*Combustion chambers, Combustion), Gas flow, Performance (Engineering), Flames, Fuels, USSR.

Contents: Location of the burning zone in the initial part of the flame tubes of GTE chambers, by G. M. Gorbunov, I. A. Lepshinskiy, and V. B. Rutovskiy; On the structure of circulating motion in a GTE chamber, by L. A. Kvasnikov; The mechanism of burning a fuel-air mixture in a GTE chamber under conditions of maximum leaning, by S. I. Shakhurin; Investigation of the characteristics of GTE combustion chambers in regimes of maximum permissible leaning under high-altitute conditions, by S. I. Shakhurin.
AD-651 086 HC$3.00 MF$0.65

SMALL GAS TURBINE ENGINE COMPONENT TECHNOLOGY, HIGH-TEMPERATURE TURBINE MATERIALS RESEARCH.
Final rept., 1 May 64-31 Aug 65,
Boeing Co Seattle Wash Turbine Div
F. H. Simpson, L. J. Fiedler, and J. Acurio. Dec 66, 168p Rept no. D4-3298
USAAVLABS-TR-66-88
Contract DA-44-177-AMC-173 (T)
See also AD-468 438.

Descriptors: (*Heat-resistant materials, Gas turbines), (*Composite materials, Gas turbines), (*Nickel alloys, Gas turbines), (*Gas turbines, Compressors), Dispersion hardening, Molybdenum, Hafnium compounds, Oxides, Nickel, Magnesium compounds, Alumina, Chromium, Thorium compounds, Turbine parts, Turbine blades.

The report describes research conducted on two new material systems (macrolaminate metal-ceramic composites and dispersion-strengthened nickel base alloys) to determine their potential for future use, without special cooling, in the turbine section of an advanced small gas turbine engine, operating at a turbine inlet temperature of 2300F. Although the research showed that the targeted high-temperature material properties could not be achieved with the macrolaminate composites or the dispersion-strengthened alloys, it was felt that these types of materials could be developed to increase turbine inlet temperatures to about 2100F. However, it was recognized that this gain would not be sufficient in view of improvements being made with other new material systems. (Author)
AD-651 103 HC$3.00 MF$0.65

PUMPING AND DRAG CHARACTERISTICS OF AN AIRCRAFT EJECTOR AT SUBSONIC AND SUPERSONIC SPEEDS.
Research memo.,
National Advisory Committee for Aeronautics, Cleveland, Ohio. Lewis Flight Propulsion Lab.
Gerald C. Gorton. 3 Jun 54, 24p
AD-31 672

Descriptors: (*Jet pumps, *Nozzle gas flow), (*Exhaust nozzles, Aircraft engines), Drag, Supersonic flight, Ejection, Thrust, Turbojet exhaust nozzles, Thrust augmentor nozzles.

An investigation was conducted in the 8- by 6-foot supersonic wind tunnel on a cylindrical-shroud ejector (diameter ratio of 1.2 and spacing ratio of 0.80). Data were obtained at weight-flow ratios of 0.014, 0.095, 0.234, and 0.380 for primary pressure ratios ranging from 1 to 16 and at free-stream Mach numbers of 0.1, 0.6, 1.6, and 2.0. The results of this investigation indicate no effort of free-stream Mach number on the pumping characteristics of an ejector of this type. Boattail pressure-drag and base pressure-drag coefficients were found to decrease with increasing primary pressure ratio similar to conventional nozzles. It was also found that these drag coefficients decreased as weight-flow ratio was increased. The results also indicate that the primary-nozzle mass-flow coefficient was affected by the secondary flow. Apparently the internal geometry of the secondary passage, at the exit station of the primary nozzle, was critical in effecting a decrease in primary-nozzle mass-flow coefficient as weight-flow ratio was increased to values greater than 0.10. (Author)
NACA-RM-E54D06 HC$3.00 MF$0.65

MATCHING OF AUXILIARY INLETS TO SECONDARY-AIR REQUIREMENTS OF AIRCRAFT EJECTOR EXHAUST NOZZLES.
Research memo.,
National Advisory Committee for Aeronautics, Cleveland, Ohio. Lewis Flight Propulsion Lab.
Donald P. Hearth, Gerald W. Englert, and Kenneth L. Kowalski. 16 Aug 55, 43p
AD-68 600

Descriptors: (*Jet pumps, Thrust augmentation), (*Exhaust nozzles, Aircraft engines), (*Engine air systems components, Turbojet exhaust nozzles), Ejection, Secondary flow, Thrust augmentor nozzles, Mach number.

An analysis of the problems associated with matching secondary-air requirements of ejector exhaust nozzles and auxiliary inlets was made for free-stream Mach numbers up to 2.0. A method for matching the components is presented. The analysis indicated that inlets located in the free stream supply higher pressure recovery than ejectors generally require for optimum net internal thrust at Mach numbers above about 1.4. Consequently, net-thrust gains may be achieved by immersing the auxiliary inlet in a boundary layer where the inlet-momentum penalty is less. At a free-stream Mach number of 2.0 a variable-inlet - variable ejector configuration would develop 9.5 percent more thrust than a convergent nozzle. A fixed-inlet - fixed-ejector combination designed for a Mach number of about 1.7 would develop net thrust within 5 percent of that possible with a variable-inlet - variable-ejector system over the entire Mach number range considered (0 to 2.0). (Author)
NACA-RM-E55D21 HC$3.00 MF$0.65

CONTRIBUTION OF DOWNSTREAM STATOR TO THE INTERACTION NOISE OF A SINGLE-STAGE AXIAL-FLOW COMPRESSOR.
National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
For primary bibliographic entry see Field 1A.
For abstract, see STAR 05 11.
N67-23288 HC$3.00 MF$0.65

TURBINE DROPLET IMPINGEMENT AND RELATED PHENOMENA.
Michigan Univ., Ann Arbor. Lab. for Fluid Flow and Heat Transport Phenomena.
For primary bibliographic entry see Field 20D.
PB-174 511 HC$3.00 MF$0.65

21H. ROCKET MOTORS AND ENGINES

BOND INSPECTION BY SCANNING IMAGES IN SCINTILLATING CRYSTALS.
Naval Ordnance Lab White Oak Md
C. H. Dyer, E. L. Criscuolo, and D. Polansky. 15 Mar 67, 22p Rept no. NOLTR-67-36

Descriptors: (*Solid rocket propellant binders, *Non-destructive testing), (*Scintillation, Scanning), X rays, Crystals, Images, Detectors, Solid rocket propellants, Rocket cases, Bonding.

Characteristics of filmless methods of bond inspection for large diameter motors are presented. High energy radiation after traversing the bond area of a motor impinges on a sodium iodide crystal, which transforms the radiation intensity into a light pattern. This image on the crystal is scanned with an optical scanning system. A photomultiplier converts the light to an electrical signal, which is then displayed on an oscilliscope. Limitations of the system due to the relatively poor image formation ability of a scintillating crystal are given. Data are presented on detectable slit sizes using a 10 Mev betatron and 14 inches of low atomic number materials. (Author)
AD-650 876 HC$3.00 MF$0.65

EFFECT OF SIMULATED BEARING COOLANT INJECTION ON THE PERFORMANCE OF A TWO-STAGE, VELOCITY-COMPOUNDED TURBOPUMP DRIVE TURBINE.
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
E. H. Gibbs, J. F. Kline, and R. G. Stabe. Apr 67, 17p NASA-TM-X-1364
Contract 128-31-02-25-22

Descriptors: *Injection, *Propulsion system performance, *Turbopump, Bearing, Coolant, Drive, Simulation, Two-stage turbine, Velocity.

For abstract, see STAR 05 11.
N67-22840 HC$3.00 MF$0.65

ELDO FUTURE PROGRAM PRELIMINARY STUDY NO. 3-1. PART 2 - NUMERICAL COMPUTATIONS FOR NONEQUILIBRIUM H2- O2 ROCKET NOZZLE FLOW.
R. Monti. 1900, 54p
Prepared for Eldo

Descriptors: *Computer program, *Nonequilibrium flow, *Nozzle flow, *Numerical analysis, *Rocket nozzle, Analysis, Chemical, Computer, Contour, Differential, Enthalpy, Equation, Flow, Gas, Hydrogen, Ibm 7040 computer, Integration, Iteration, Kinetics, Linear, Method, Nonequilibrium, Nozzle, Numerical, Oxygen, Program, Rate, Reaction, Rocket.

For abstract, see STAR 05 11.
N67-22902 HC$3.00 MF$0.65

THE DERIVATION OF THE TRANSFER FUNCTION OF A SYSTEM FROM FREQUENCY RESPONSE DATA.
Rocket Propulsion Establishment, Westcott (England).
A. J. Meade. Aug 66, 39p RPE-TR-66/9

Descriptors: *Computer program, *Frequency response, *Liquid propellant rocket engine, *Transfer function, Coefficient, Component, Computer, Differential, Equation, Error, Frequency, Function, Gain, Liquid, Measurement, Phase, Program, Propellant, Response, Rocket engine, Transfer.

For abstract, see STAR 05 11.
N67-23100 HC$3.00 MF$0.65

RL10A-3-3 ROCKET ENGINE OXIDIZER PUMP DEVELOPMENT PROGRAM, AUGUST 1965 - JUNE 1966.
Pratt and Whitney Aircraft, West Palm Beach, Fla. Florida Research and Development Center.
A. J. Letson. 30 Dec 66, 91p NASA-CR-83547, PWA-FR-1890
Contract NAS8-15494

Descriptors: *Oxidizer, *Pump, *Rocket engine, Analysis, Carbon, Design, Housing, Inducer, Liquid, Metal, Oxygen, Performance, Ring, Seal, Shaft, Static, Test.

For abstract, see STAR 05 11.
N67-23274 HC$3.00 MF$0.65

FREE JET IMPINGEMENT NORMAL TO A CURVED SURFACE IN A VACUUM.
National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
L. V. Clark. Apr 67, 74p NASA-TN-D-3920
Contract 124-08-05-09-23

Descriptors: *Curved surface, *Exhaust jet, *Jet impingement, Curve, Exhaust, Impingement, Jet, Pressure, Shock, Surface.

For abstract, see STAR 05 11.
N67-23299 HC$3.00 MF$0.65

INVESTIGATION OF A SUBMERGED NOZZLE FOR SOLID ROCKETS.
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
J. J. Pelouch, Jr., and R. J. Salmi. 1967, 12p NASA-TM-X-52285
for Presentation At the 2d Solid Propulsion Conf., Anaheim, Calif., 6-8 Jun. 1967

Descriptors: *Annular flow, *Flow velocity, *Rocket nozzle, *Solid propellant rocket engine, Air, Annulus, Channel, Compression, Direction, Distortion, Engine, Equipment, Erosion, Exhaust, Flow, Method, Model, Nozzle, Propellant, Rocket, Scale, Simulation, Solid, Submerged, Test, Velocity.

For abstract, see STAR 05 11.
N67-23310 HC$3.00 MF$0.65

21I. ROCKET PROPELLANTS

A PHALANX FLAME MODEL FOR THE COMBUSTION OF COMPOSITE SOLID PROPELLANTS.
Virginia Univ Charlottesville
For primary bibliographic entry see Field 21B.
AD-650 868 Not available from CFSTI.

BOND INSPECTION BY SCANNING IMAGES IN SCINTILLATING CRYSTALS,
Naval Ordnance Lab White Oak Md
For primary bibliographic entry see Field 21H 14.
AD-650 876 HC$3.00 MF$0.65

RESEARCH STUDY ON HEF FIRE FIGHTING,
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
For primary bibliographic entry see Field 13L.
AD-650 982 HC$3.00 MF$0.65

USE OF THE HYSTERESIS LOOP METHOD TO STUDY THIXOTROPIC SUSPENSIONS. PART 2. ACETYLENE BLACK IN HYDRAZINE AND PYROGENIC SILICA IN LIQUIDS OF VARYING POLARITY,
Naval Research Lab Washington D C
J. T. Leonard, and R. N. Hazlett. 21 Mar 67, 36p Rept no. NRL-6509
See also AD-647 354.

Descriptors: (*Thixotropic rocket propellants, Rheology), (*Gels, Hysteresis), Carbon black, Hydrazine, Colloids, Silicon dioxide, Alkanes, Alcohols, Dimethyl hydrazine (1-1), Viscosity, Plasticity, Stresses, Liquid rocket propellants, Handling, Safety, Models (Simulations).

The hysteresis loop method was used to study the flow properties of suspensions of acetylene black in hydrazine and of pyrogenic silica in n-decane, hydrazine, unsymmetrical dimethylhydrazine, n-propyl and isopropyl alcohols, and water. It was found that the acetylene black/hydrazine system behaved ideally, in that the plastic viscosity and yield stress values of these suspensions followed Arrhenius' law at low concentrations and Weltman and Green's equation at higher concentrations. Of the silica suspensions tested, only the pyrogenic silica/n-decane system exhibited the same exponential dependence of plastic viscosity and yield stress on concentration as was found for the ideal thixotropic suspensions. The remaining silica suspensions either broke down irreversibly under high shear conditions or were otherwise unsuitable for study by the hysteresis loop method. (Author)
AD-651 022 HC$3.00 MF$0.65

INVESTIGATION OF HIGH ACCELERATION ON THE INTERIOR BALLISTICS OF SOLID PROPELLANT ROCKET MOTORS.
Final rept.,
Purdue Univ Lafayette Ind Jet Propulsion Center
B. W. Farquhar, D. J. Norton, and J. D. Hoffman. Dec 66, 53p Rept no. F-66-10, JPC-430
Contract DA-01-021-AMC-12864 (Z)

Descriptors: (*Rocket motors (Solid propellant), *Interior ballistics), Acceleration, Instrumentation, Models (Simulations), Mass transfer, Thrust, Nozzles, Propellant grains, Spin.

An investigation was undertaken on the effects of high acceleration on the interior ballistics of solid propellant rocket motors. A description of the cold flow spin test apparatus and instrumentation is presented. The results of some of the preliminary tests are given and the program for future testing is described. An analytical study is presented which describes various simplified models which account for the effects of rotation on the mass flow and thrust producing capabilities of the nozzle. Results are given for two limiting cases: (1) uniform axial velocity profiles at each plane in the nozzle; (2) uniform angular velocity profiles at each plane in the nozzle. These cases are discussed and a more advanced model is formulated. The complete model is described and future analytical computations are discussed. (Author)
AD-651 110 HC$3.00 MF$0.65

OPACITY OF HOT, HIGHLY COMPRESSED HYDROGEN.
Naval Ordnance Lab White Oak Md
For primary bibliographic entry see Field 7D.
AD-651 203 HC$3.00 MF$0.65

ELDO TECHNICAL REVIEW, VOLUME I, NO. 3.
European Space Vehicle Launcher Development Organization, Paris (France).
For primary bibliographic entry see Field 22D.
For abstract, see STAR 05 11.
N67-22491 HC$3.00 MF$0.65

THE USE OF CATALYTIC SURFACTANTS IN PLASTIC PROPELLANTS.
Explosives Research and Development Establishment, Waltham Abbey (England).
For primary bibliographic entry see Field 19A.
For abstract, see STAR 05 11.
N67-22785 HC$3.00 MF$0.65

THE COMBUSTION OF AMMONIUM PERCHLORATE-BASED COMPOSITE PROPELLANTS - A DISCUSSION OF SOME RECENT EXPERIMENTAL RESULTS.
Explosives Research and Development Establishment, Waltham Abbey (England).
For primary bibliographic entry see Field 21B.
For abstract, see STAR 05 11.
N67-22786 HC$3.00 MF$0.65

22. SPACE TECHNOLOGY

22A. ASTRONAUTICS

JET SHOES - AN EXTRAVEHICULAR SPACE LOCOMOTION DEVICE.
National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
For primary bibliographic entry see Field 6B.
For abstract, see STAR 05 11.
N67-21961 HC$3.00 MF$0.65

RADIOMETRY RESEARCH.
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
For primary bibliographic entry see Field 14B.
For abstract, see STAR 05 11.
N67-22141 HC$3.00 MF$0.65

SPACE STATION MISSION SIMULATION MATHEMATICAL MODEL SUMMARY REPORT.
General Dynamics/Fort Worth, Tex. Operations Research Section.
27 Mar 67, 26p NASA-CR-66316, FZM-4779, VOL. I
Contract NAS1-5874

Descriptors: *Computer method, *Manned orbital research laboratory (morl), *Mathematical model, *Mission planning, Crew, Experiment, Logistics, Mathematics, Mission, Morl, Operation, Planning, Research, Simulation, Station.

For abstract, see STAR 05 11.
N67-22159 HC$3.00 MF$0.65

SPACE STATION MISSION SIMULATION MATHEMATICAL MODEL.
General Dynamics/Fort Worth, Tex. Operations Research Section.
6 Feb 67, 318p NASA-CR-66316, FZM-4770, VOL. II
Contract NAS1-5874

Descriptors: *Computer simulation, *Mathematical model, *Space station, Computer, Earth, Mathematics, Model, Orbital, Problem, Procedure, Simulation, Space, Station.

For abstract, see STAR 05 11.
N67-22160 HC$3.00 MF$0.65

PROBLEMS AND TECHNIQUES OF LUNAR SURFACE MINING.
National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
R. M. Cox, S. A. Fields, R. Q. Shotts, and H. M. Weathers. 10 Jan 67, 50p NASA-TM-X-53560

Descriptors: *Lunar surface, *Materials science, *Mining, Adhesion, Bibliography, Cost, Environment, Estimate, Factor, Lunar, Material, Mineral, Ore, Porosity, Safety, Science, Selenology, Strength, Surface, Vacuum, Weight.

For abstract, see STAR 05 11.
N67-22172 HC$3.00 MF$0.65

AUTOMATED BIOLOGICAL LABORATORY SOIL SAMPLING STUDY FINAL REPORT, 17 FEB. 1966 - 17 FEB. 1967.
Aeronutronic, Newport Beach, Calif. Space and Re-entry Systems Div.
W. H. Bachle. 17 Feb 67, 301p NASA-CR-83516, UG-3962
Contract NASW-1065

Descriptors: *Sampling device, *Soil, *Voyager project, Acquisition, Automation, Biological, Boom, Capsule, Cone, Device, Drop, Gravity, Horizontal, Laboratory, Mars, Mars probe, Mechanical, Pneumatic, Probe, Prototype, Sampling, Sieve.

For abstract, see STAR 05 11.
N67-22222 HC$3.00 MF$0.65

MINIMUM ENERGY REACTION WHEEL CONTROL FOR A SATELLITE SCANNING A SMALL CELESTIAL AREA.
National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
M. J. Bondi, and W. R. Wehrend, Jr.. Apr 67, 29p NASA-TN-D-3922
Contract 125-19-03-09-00-21

Descriptors: *Aoso, *Maneuverable satellite, *Reaction wheel, *Scanning, Area, Celestial, Control, Energy, Equation, Maneuver, Minimum, Raster, Reaction, Satellite, Wheel.

For abstract, see STAR 05 11.
N67-22870 HC$3.00 MF$0.65

SUCCESS OF LUNA-13. THE MOON IS NOT A DEAD HEAVENLY BODY.
Succes de Luna-13. La Lune N'est Pas Un Astre Mort
Volt Technical Corp., Washington, D. C.
G. Ajoux. 13 Feb 67, 4p NASA-CR-83533, ST-PR-LPS-10562
Contract NAS5-12487
Transl. Into English From Pourquoi Pas (Brussels), 12 Jan. 1967

Descriptors: *Lunar crust, *Lunar probe, *Radioactivity, Crust, Decay, Density, Experiment, Fast, Gamma, Lunar, Neutron, Probe, Radiation, Soil, Surface.

For abstract, see STAR 05 11.
N67-23259 HC$3.00 MF$0.65

STABILITY AND DRAG CHARACTERISTICS AT MACH NUMBERS OF 10 AND 26 OF A PROPOSED SLENDER ATMOSPHERIC PROBE.
National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
For primary bibliographic entry see Field 1A.
For abstract, see STAR 05 11.
N67-23296 HC$3.00 MF$0.65

LAUNCH WINDOW CHARACTERISTICS OF THE 1972 AND 1973 JUPITER OPPORTUNITIES.
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
T. J. Kreiter. 21 Mar 67, 32p NASA-TM-X-52288

Descriptors: *Atlas centaur launch vehicle, *Jupiter (planet), *Launch window, *Mission planning, Ascent, Characteristics, Flyby, Galaxy, Launch, Mission, Planning, Probe, Solar, Trajectory, Unmanned, Window.

For abstract, see STAR 05 11.
N67-23314 HC$3.00 MF$0.65

AN ANALYSIS OF RESULTS OF THERMAL-VACUUM TESTS ON OGO EXPERIMENTS.
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
N. E. Lucas, and A. R. Timmins. Feb 67, 45p NASA-TM-X-55748, X-326-67-75

Descriptors: *Environmental testing, *Ogo, *Space simulation, Environment, Experiment, Failure, Simulation, Space, Testing, Thermal, Vacuum.

For abstract, see STAR 05 11.
N67-23318 HC$3.00 MF$0.65

PROTON-ELECTRON SPECTROMETER EXPERIMENTS ON GEMINI-4 AND GEMINI-7 FINAL REPORT, 27 MAY 1963 - 30 SEP. 1966.
Lockheed Missiles and Space Co., Palo Alto, Calif. Research Lab.
J. C. Bakke, M. A. Heinemann, W. L. Imhof, J. B. Reagan, and R. V. Smith. 30 Sep 66, 94p NASA-CR-65604, LMSC-2-44-66-1
Contract NAS9-1587

Descriptors: *Electron flux, *Proton belt, *Radiation measurement, *Scintillation spectrometer, *Spacecraft sensor, Atmosphere, Belt, Calibration, Design, Electron, Environment, Experiment, Flux, Gemini spacecraft, Measurement, Performance, Proton, Radiation, Scintillation, Sensor, Spacecraft, Spectrometer, Spectrum.

For abstract, see STAR 05 11.
N67-23326 HC$3.00 MF$0.65

BULLETIN NO. 3.
Swiss Association for Space Technology, Zurich (Switzerland).
15 Dec 66, 20p
in French and German

Descriptors: *Rocketry, *Satellite communication, *Space science, Communication, Ground, Progress, Research, Satellite, Science, Space, Station, Switzerland, Technology.

For abstract, see STAR 05 11.
N67-23400 HC$3.00 MF$0.65

THE FIRST LANDING ON THE MOON, BY LUNA 9.
Royal Aircraft Establishment, Farnborough (England).
20 Apr 66, 37p RAE-LIB-TRANS-96
Transl. Into English From Russian

Descriptors: *Lunik ix lunar probe, *Soft landing, Communication, Flight, Landing, Lunar, Soft, Spacecraft, Surface, Telemetry.

For abstract, see STAR 05 11.
N67-23451 HC$3.00 MF$0.65

22B. SPACECRAFT

REMOTE SENSING OF ENVIRONMENT.
Progress rept., 1 Aug 65-31 Dec 66,
Michigan Univ Ann Arbor Inst of Science and Technology
Virginia L. Prentice. Apr 67, 28p Rept no. 4864-12-P
Contract Nonr-1224 (44)
See also AD-614 032.

Descriptors: (*Space probes, Symposia), (*Atmospheric sounding, Instrumentation), (*Remote control systems, Monitors), Radar, Radar images, Infrared images, Bibliographies, Environment, Lasers, Microwaves, Infrared radiation, Electromagnetic waves.

This document reports investigation of progress in the unclassified areas in the technology of remote sensing of environment. It includes a synopsis of progress in the field as reported at the Fourth Symposium on Remote Sensing of Environment, a discussion of the existence and availability of unclassified imagery, and a summary of related activities. A selected bibliography of material published in the open literature is also included.
AD-650 581 HC$3.00 MF$0.65

A GEOMETRIC SIMULTANEOUS MULTISTATION DETERMINATION, WITH CONSTRAINTS, USING DATA FROM GEODETIC SATELLITES.
Research note,
Army Engineer Geodesy Intelligence and Mapping Research and Development Agency Fort Belvoir Va
Lawrence A. Gambino. Mar 67, 24p Rept no. RN-22
Presented at the Army Science Conference USMA (1966), West Point, N. Y., 14-17 Jun 1966.

Descriptors: (*Satellites (Artificial), *Data), Geodesics, Satellite tracking systems, Trajectories, Matrix algebra, Least squares method, Mathematical prediction, Geometry, Satellite networks, Equations, Optical tracking, Army research.

The observation equations for two types of satellite tracking systems are derived from a purely geometric standpoint. The introduction of these equations into the adjustment is flexible enough to allow for any combination of data to enter into the formation of the normal equations. Included in the development is the utilization of weight constraints, in which the coordinates of the ground tracking stations and satellite points may be weighted according to how well they are known. The highly patterned character of the large system of normal equations lends itself to inversion by matrix partitioning in which the largest matrix to be inverted is that involving only the tracking station parameters. Thus, for a fixed number of tracking stations the computations will increase only linearly with the number of satellite points used in the reduction. (Author)
AD-650 739 HC$3.00 MF$0.65

HYPERSONIC DYNAMIC STABILITY. PART I. SUMMARY.
General Electric Co Philadelphia Pa Missile and Space Div
For primary bibliographic entry see Field 22C.
AD-650 794 HC$3.00 MF$0.65

PENDULUM IN CABIN OF ARTIFICIAL EARTH SATELLITE,
Foreign Technology Div Wright-Patterson AFB Ohio
A. I. Lurye. 23 Jan 67, 13p Rept no. FTD-TT-65-1563
TT-67-61599
Maitnik v Kaline Iskusstvennogo Sputnika Zemli. Unedited rough draft trans. of Voprosy Dinamiki i Prochnosti (USSR) n10 p13-20 1963.

Descriptors: (*Satellites (Artificial), *Gravity), Weightlessness, Differential equations, Satellite attitude, Velocity, Equations of motion, Acceleration, Equilibrium, USSR.

The transfer of the classical pendulum problem into the peculiar 'weightless' environment of an artificial earth satellite may be of both theoretical and practical interest. Consequently, starting from appropriate differential equations, the author discusses the motion of a plane pendulum (the case of the spherical pendulum was studied earlier by J. L. Synge (Proc. of Roy. Irish Acad., Vol. 60, 1961, No. 1)) and the motion of a heavy sphere along a straight groove. He shows that by using measurements on properly oriented grooves one should, in principle, be able to determine the direction of the vertical, the distance from the center of the earth, the angular velocity vector, and the nongravitational acceleration within the artificial satellite. (Author)
AD-650 808 HC$3.00 MF$0.65

SOME ASPECTS OF THERMAL MODEL TESTING IN SPACE CHAMBERS.
Rept. for May 64-Nov 66,
Arnold Engineering Development Center Arnold Air Force Station Tenn
K. W. Nutt, and J. A. van der Blick. Apr 67, 30p Rept no. AEDC-TR-67-38
Contract AF 40(600)-1200
Prepared in cooperation with ARO, Inc., Arnold Air Force Station, Tullahoma, Tenn.

Descriptors: (*Spacecraft, *Space simulation chambers), (*Thermal radiation, Space simulation chambers), Environmental tests, Models (Simulations), Thermal stresses, Solar radiation, Model tests, USSR.

Various facets of thermal testing of space vehicles in cold vacuum chambers, with and without solar simulation, are discussed. Emphasis is on thermal modeling of spacecraft. Thermal modeling is discussed for the case of simultaneous preservation of temperature, material and surface properties. The following specific items are treated: a criterion for the application of isothermal modeling is developed and illustrated with experimental data, rules for nonisothermal modeling are discussed and illustrated with experimental results, the effect of internal convection is calculated and modeling rules are developed, the effect of internal radiation is discussed and the relative importance illustrated theoretically, and a criterion is developed for the degree of intensity nonuniformity for a solar simulator in terms of desired temperature accuracy. (Author)
AD-650 814 HC$3.00 MF$0.65

HYPERSONIC DYNAMIC STABILITY. PART II. CONICAL BODY EXPERIMENTAL PROGRAM.
General Electric Co Philadelphia Pa Missile and Space Div
For primary bibliographic entry see Field 22C.
AD-650 866 HC$3.00 MF$0.65

HYPERSONIC DYNAMIC STABILITY. PART III. UNSTEADY FLOW FIELD PROGRAM.
General Electric Co Philadelphia Pa Missile and Space Div
For primary bibliographic entry see Field 22C.
AD-650 879 HC$3.00 MF$0.65

AN EXAMPLE OF THE ANALYSIS OF SATELLITE BUNCHING CHARACTERISTICS,
Rand Corp Santa Monica Calif
For primary bibliographic entry see Field 22C.
AD-650 905 HC$3.00 MF$0.65

ANNA 1B SATELLITE DATA FOR DAYS 115 THROUGH 122,
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
R. J. Finneran. 6 Aug 63, 19p Rept no. CF-3051
Contract NOw-62-0604

Descriptors: (*Scientific satellites, Telemetering data), (*Satellite tracking systems, Data), Tracking, Very high frequency, Ultrahigh frequency, Doppler effect, Orbital trajectories, Time signals, Helical antennas, Signal-to-noise ratio.
Identifiers: ANNA, Geodetic satellites.

ANNA 1B satellite passes were tracked in Exploratory Tracking Station 091 at APL/JHU when the satellite was in 100 percent sunlight orbit during Days 115 through 122 (April 25 through May 2) to provide satellite data for analysis. Ionospheric correction doppler data was recovered on the 162 Mcs/324 Mcs frequency pair, for satellite orbit determination. Satellite time bursts on 162 Mcs were recorded to measure station time recovery errors. Good satellite time recovery was accomplished at approximately 89 second intervals throughout the satellite passes at signal levels of -115 dbm to -142 dbm referenced to the antenna output. Good doppler data was received and sent to the computer on all passes except for Day 116 when the station tuning adjustments were incorrect. The average satellite signal level at the closest approach of the satellite varied from -111 dbm to -119 dbm on 162 Mcs and from -114 dbm to -121 dbm on 324 Mcs referenced to the antenna output. Left-hand circularly polarized helical antennas were used with approximately 11 db gain over an isotropic antenna on 162 Mcs and 14 db gain over isotropic on 324 Mcs. This analysis shows that more accurate satellite time recovery can be obtained by improved tracking station operating and alignment procedures. (Author)
AD-650 979 HC$3.00 MF$0.65

RADIO-ACTIVE HEATING OF SATELLITES,
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
Theodore Wyatt. 1 Nov 62, 30p Rept no. CF-3007
Contract NOw-62-0604

Descriptors: (*Satellites (Artificial), *Thermal radiation), Design, Generators, Thermoelectricity, Solar radiation, Equilibrium, Infrared radiation, Equations, Absorption, Emissivity, Cooling, Electronic equipment, Temperature control, Space environmental conditions.

The importance of temperature control in satellites so as to maintain components within operating limits is well known. As the emphasis in satellite usage has shifted to the economical maintenance of operational systems, attention has been directed to the factors influencing satellite life in orbit. There is a prevalent belief that one cause of satellite equipment failure is mechanical fatigue failure as the result of stress changes due to temperature changes, even though component limits are not exceeded. There is an interest in maintaining satellite temperatures as constant as possible, as well as remaining within prescribed limits. The paper presents a way of accomplishing both objectives. The technical information was derived from public sources, including 'Source Book on Atomic Energy' by Glasstone, 'Thermoelectric Materials and Devices' by Cadoff and Miller, and official press releases. The reader is advised not to infer the application of the design considerations herein discussed to any specific satellite program or satellite model. This study was performed with the cooperation and advice of R. E. Davis, W. J. Billerbeck and his associates of this Laboratory, and L. D. Eckard, Jr., now a member of NASA. Their assistance is gratefully acknowledged.
AD-650 988 HC$3.00 MF$0.65

ANNA I MEMORY,
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
B. M. Elder. 12 Dec 62, 22p Rept no. CF-3012
Contract NOw-62-0604

Descriptors: (*Memory, Real time), (*Data storage systems, Sequences), Number theory, Scalers, Gates (Circuits), Relaxation oscillators, Satellites (Artificial).

The memory unit in the ANNA satellite is employed to initiate flash sequences in an optical beacon system at predetermined real times. Requested times for optical sequencing are converted to binary numbers which are injected into the memory. Each binary number is a function of the real time of injection and the real time start of each requested sequence. The memory operates on these word oriented numbers and commands the optical logic at the appropriate times. The memory unit occupies 1350 cubic inches (see figures 1, 2 and 3), it weighs 21 pounds, and consumes 1.3 watts of power. The unit is designed to operate over a voltage range of plus or minus 15% and a temperature range of +135 deg. F to -10 deg. F.
AD-650 992 HC$3.00 MF$0.65

MOMENTUM TRANSFER AS A MEANS OF DESPINNING A ROTATING SPACECRAFT.
Technical memo.,
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
J. F. Smola. Jan 67, 47p Rept no. TG-885
Contract NOw-62-0604

Descriptors: (*Spacecraft, Spin), (*Satellites (Artificial), Spin), Momentum, Rotation, Cables (Mechanical), Control systems, Potential energy, Damping.

The angular rate of a rotating spacecraft can be reduced by transferring momentum from the spacecraft body to a pair of masses attached to cables wrapped around it. The cables unwind and retard spin with a counteracting couple. Under the proper conditions, spin can be reduced to zero; this is found to be independent of initial spin rate. Detaching the cables at this instant leaves the spacecraft motionless. Residual spin due to tolerance accumulation can be minimized by releasing cables when radial rather than tangent to the spacecraft. (Author)
AD-651 004 HC$3.00 MF$0.65

DEVELOPMENT AND EVALUATION OF MAGNETIC AND ELECTRICAL MATERIALS CAPABLE OF OPERATING IN THE 800 DEG TO 1600 DEG F TEMPERATURE RANGE QUARTERLY REPORT, 1 DEC. 1965 - 28 FEB. 1966.
Westinghouse Electric Corp., Lima, Ohio. Aerospace Electrical Div.
P. E. Kueser. Mar 66, 253p NASA-CR-54358, WAED-66.33E
Contract NAS3-6465

Descriptors: *Capacitor, *Dielectric material, *High temperature alloy, *Magnetic material, *Spacecraft power supply, Boron, Cobalt, Dispersion, Electric, Hardening, Iron, Lightweight, Niobium, Nitride, Precipitation, Pyrolysis, Strength, Tensile, Thermostability, Zirconium.

For abstract, see STAR 05 11.
N67-22066 HC$3.00 MF$0.65

THIRD SURVEYOR LAUNCH SLATED AT CAPE KENNEDY.
National Aeronautics and Space Administration, Washington, D. C.
14 Apr 67, 48p NASA NEWS RELEASE-67-85

Descriptors: *Atlas centaur launch vehicle, *Flight plan, *Surveyor project, Apollo project, Communication, Design, Flight, Instrumentation, Landing, Lunar, Plan, Spacecraft, Surface, Tracking, Trajectory.

For abstract, see STAR 05 11.
N67-22071 HC$3.00 MF$0.65

AN EVALUATION OF AN OPERATIONAL SOUNDING ROCKET TO FULFILL A NEW 100 KILOMETER REQUIREMENT.
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
E. E. Mayo, and M. B. Nolan. Mar 67, 19p NASA-TM-X-55738, X-721-67-144

Descriptors: *Flight characteristics, *Nike-tomahawk rocket, *Sounding rocket, *Static stability, Altitude, D layer, Dynamics, E layer, Ionosphere, Motion, Payload, Pitch, Rocket, Roll, Sounding, Stability, Static, Tomahawk rocket.

For abstract, see STAR 05 11.
N67-22075 HC$3.00 MF$0.65

NOSE SELECTION AND VEHICLE MOTION DYNAMICS FOR THE SECOND STAGE OF A TWO-STAGE SOUNDING ROCKET SYSTEM.
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
E. E. Mayo, and M. B. Nolan. Mar 67, 16p NASA-TM-X-55739, X-721-67-145

Descriptors: *Flight characteristics, *Nike-tomahawk rocket, *Rocket nose cone, Altitude, Bending, Characteristics, Cone, Damping, Dynamics, Equilibrium, Fin, Flight, Interface, Moment, Motion, Nose, Payload, Performance, Pitch, Rocket, Shape, Stability, Thrust.

For abstract, see STAR 05 11.
N67-22077 HC$3.00 MF$0.65

AUTOMATED NOSE FAIRING DESIGN -- RING AND SKIN CONSTRUCTION.
Lockheed Missiles and Space Co., Huntsville, Ala. Research and Engineering Center.
A. B. Burns. Nov 65, 184p NASA-CR-83318, HREC/5485-1
Contract NAS8-15485

Descriptors: *Computer program, *Fairing, *Nose cone, *Reinforced shell, Aerodynamics, Computer, Cone, Fortran, Metal, Nose, Optimization, Program, Reinforcement, Ring, Sheet, Shell, Skin, Stiffness, Structure, Subroutine.

For abstract, see STAR 05 11.
N67-22180 HC$3.00 MF$0.65

AUTOMATED NOSE FAIRING DESIGN RING, SKIN AND STRINGER CONSTRUCTION TECHNICAL REPORT, JUL. - NOV. 1965.
Lockheed Missiles and Space Co., Huntsville, Ala. Research and Engineering Center.
A. B. Burns, and E. S. Hendrix. Dec 65, 153p NASA-CR-83566, LMSC/HREC-A712572
Contract NAS8-15485

Descriptors: *Fairing, *Fortran, *Nose cap, *Skin, Cap, Cone, Construction, Cylinder, Design, Nose, Printout, Ring, Spherical, Stringer, Synthesis.

For abstract, see STAR 05 11.
N67-22258 HC$3.00 MF$0.65

SATELLITE TRANSITS RECORDED AT EARLYBURN, OCTOBER TO DECEMBER 1965.
Royal Observatory, Edinburgh (Scotland). Satellite Tracking Div.
B. Mc Innes. 29 Sep 66, 4p REPT.-55

Descriptors: *Cinetheodolite, *Satellite observation, Artificial, Cosmos satellite, Explorer satellite, Film, Observation, Photographic, Satellite, Tracking, Transit.

For abstract, see STAR 05 11.
N67-22497 HC$3.00 MF$0.65

SATELLITE TRANSITS RECORDED AT EARLYBURN, JANUARY TO MARCH 1966.
Royal Observatory, Edinburgh (Scotland). Satellite Tracking Div.
B. Mc Innes. 9 Dec 66, 8p REPT.-60

Descriptors: *Cinetheodolite, *Satellite observation, *Transit satellite, Ariel satellite, Artificial, Cosmos satellite, Explorer satellite, Film, Observation, Photographic, Polyot satellite, Satellite, Tracking, Transit.

For abstract, see STAR 05 11.
N67-22499 HC$3.00 MF$0.65

A PILOTED SIMULATION STUDY OF MANUAL GUIDANCE OF THE UPPER STAGES OF A LARGE LAUNCH VEHICLE.
National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif. National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
D-
G. H. Hardy, R. L. Kurkowski, and G. D. Ritter. Apr 67, 42p NASA-TN-D-3901
Contract 904-01-08-02

Descriptors: *Guidance and control, *Manual control, *Saturn v launch vehicle, Altitude, Analog, Control, Error, Flight, Guidance, Launch vehicle, Manual, Pilot, Simulation, Stage, Upper.

For abstract, see STAR 05 11.
N67-22868 HC$3.00 MF$0.65

AIRBORNE AND MISSILE BORNE CAMERAS DEVELOPED BY WEAPONS RESEARCH ESTABLISHMENT.
Weapons Research Establishment, Salisbury (Australia). Dept. of Supply.
For primary bibliographic entry see Field 14E.
For abstract, see STAR 05 11.
N67-22936 HC$3.00 MF$0.65

SATURN INTEGRATED CIRCUIT RELIABILITY TEST PROGRAM QUARTERLY PROGRESS REPORT, OCT. - DEC. 1966.
Motorola, Inc., Phoenix, Ariz. Semiconductor Products Div.
For primary bibliographic entry see Field 9A.
For abstract, see STAR 05 11.
N67-23265 HC$3.00 MF$0.65

DYNAMIC MODEL INVESTIGATION OF THE ROUGH-WATER LANDING CHARACTERISTICS OF A SPACECRAFT.
National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
W. C. Thompson. Apr 67, 25p NASA-TN-D-3774
Contract 124-08-04-12-23

Descriptors: *Dynamic model, *Gemini spacecraft, *Spacecraft landing, *Water landing, Acceleration, Lateral, Longitudinal, Parachute, Roughness, Simulation, Surface, Yaw.

For abstract, see STAR 05 11.
N67-23281 HC$3.00 MF$0.65

FLIGHT-TEST EVALUATION OF AN ON-OFF RATE COMMAND ATTITUDE CONTROL SYSTEM OF A MANNED LUNAR-LANDING RESEARCH VEHICLE.
National Aeronautics and Space Administration. Flight Research Center, Edwards, Calif.
C. R. Jarvis. Apr 67, 39p NASA-TN-D-3903
Contract 924-23-21-13-24

Descriptors: *Attitude control, *Command control, *Lunar landing module, *Manned spacecraft, Attitude, Characteristics, Command, Control, Flight, Landing, Lunar, Manned, Module, Performance, Pilot, Pitch, Roll, Simulation, Spacecraft, Test, Vtol.

For abstract, see STAR 05 11.
N67-23293 HC$3.00 MF$0.65

STATIC AERODYNAMIC CHARACTERISTICS OF THE ABORTED APOLLO- SATURN V VEHICLE.
National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
R. M. Glasgow. 9 Mar 67, 106p NASA-TM-X-53587

Descriptors: *Abort, *Apollo spacecraft, *Saturn v launch vehicle, *Static aerodynamic characteristics, Aerodynamic, Analysis, Axial, Characteristic, Force, Model, Pressure, Scale, Static, Structural, Test, Tunnel, Wind.

For abstract, see STAR 05 11.
N67-23344 HC$3.00 MF$0.65

BULLETIN NO. 3.
Swiss Association for Space Technology, Zurich (Switzerland).
For primary bibliographic entry see Field 22A.
For abstract, see STAR 05 11.
N67-23400 HC$3.00 MF$0.65

DESIGN STUDY FOR AN IMPROVED SATELLITE INFRARED SPECTROMETER.
Philips Labs., Briarcliff Manor, N. Y.
For primary bibliographic entry see Field 20F.
PB-174 519 HC$3.00 MF$0.65

PUBLICATIONS BY STAFF MEMBERS, NATIONAL ENVIRONMENTAL SATELLITE CENTER AND FINAL REPORTS ON CONTRACTS AND GRANTS SPONSORED BY THE NATIONAL ENVIRONMENTAL SATELLITE CENTER 1958-1966.
Technical memo.
National Environmental Satellite Center, Mar 67, 34p NESCTM-1

Descriptors: (*Meteorological satellites, Reports), Environment, Contracts, Scientific research, Satellites (Artificial), Data, Bibliographies.

Papers on the following topics will be found in these listings; Interpretation of satellite data; Research with satellite data; Operational applications of satellite data; Radiative characteristics of the atmosphere; Instrument engineering and development; Spacecraft systems engineering; Archival systems; Communications systems; Spacecraft operation and control. (Author)
PB-174 606 HC$3.00 MF$0.65

TIROS CLOUD FREE ATLAS: NORTH AMERICA CENTRAL UNITED STATES SPRING SEASON.
Bohan (Walter A.) Co., Park Ridge, Ill.
For primary bibliographic entry see Field 4B.
PB-174 610 HC$3.00 MF$0.65

TIROS CLOUD FREE ATLAS: NORTH AMERICA EASTERN UNITED STATES SPRING SEASON,
Bohan (Walter A.) Co., Park Ridge, Ill.
For primary bibliographic entry see Field 4B.
PB-174 611 HC$3.00 MF$0.65

TIROS CLOUD FREE ATLAS: NORTH AMERICA WESTERN UNITED STATES SPRING SEASON,
Bohan (Walter A.) Co., Park Ridge, Ill.
For primary bibliographic entry see Field 4B.
PB-174 612 HC$3.00 MF$0.65

22C. SPACECRAFT TRAJECTORIES AND REENTRY

HYPERSONIC DYNAMIC STABILITY. PART I. SUMMARY.
Final rept., May 63-Oct 65,
General Electric Co Philadelphia Pa Missile and Space Div
L. A. Marshall. Jan 67, 94p
FFDL-TDR-64-149-Pt-1
Contract AF 33 (657)-11411
See also AD-650 866.

Descriptors: (*Reentry vehicles, Stability), (*Hypersonic flight, Reentry vehicles), Dynamics, Atmosphere entry, Conical bodies, Angle of attack, Flow fields, Boundary value problems.

The report presents a summary of the important results obtained on a combined analytical and experimental program for investigation of the hypersonic dynamic stability of re-entry vehicles. An unsteady flow field solution is described which predicts the static and dynamic stability characteristics for vehicles which are executing small amplitude oscillations about zero angle of attack. Solutions were obtained for sharp and blunted, axisymmetric and two-dimensional shapes in real gas equilibrium flow. The experimental program was conducted in AEDC tunnel 'C' at Mach 10 and in the Ling-Temco-Vought Hot Shot tunnel at Mach 14 and 20 to obtain dynamic stability characteristics of a 10 degree cone. Data are presented to show the effect of bluntness ratio, reduced frequency, center of gravity location, Reynolds number and Mach number. Comparisons are made with various theoretical results and limited correlations are shown which establish significant trends. (Author)
AD-650 794 HC$3.00 MF$0.65

HYPERSONIC DYNAMIC STABILITY. PART II. CONICAL BODY EXPERIMENTAL PROGRAM.
Final rept., May 63-Oct 65,
General Electric Co Philadelphia Pa Missile and Space Div
R. B. Hobbs, Jr. Jan 67, 107p
AFFDL-TDR-64-149-Pt-2
Contract AF 33 (657)-11411
See also AD-650 794, AD-650 879.

Descriptors: (*Reentry vehicles, Stability), (*Hypersonic flight, Reentry vehicles), (*Conical bodies, Hypersonic flight), Dynamics, Atmosphere entry, Oscillation, Correlation techniques, Experimental data.

Wind tunnel tests were conducted at M = 10 and at M = 14 and 20 to obtain experimental data on the hypersonic dynamic stability characteristics of a 10-degree half-angle cone. These data were generated to support dynamic stability studies and to evaluate the effects of many geometric and environmental variables, which influence the oscillatory motion of re-entry vehicles. The state-of-the-art of experimental ground testing in hypersonic dynamic stability is reviewed in detail with respect to simulation and data measuring capabilities. Data correlations were obtained to compare facilities and to evaluate the degree of consistency of results using different techniques in measuring and reducing the data. The confidence level for the data is established by means of these correlations, and conclusive interpretations of the data for application in flight estimates can only be made when the significance of these correlations are fully realized. The data correlations do bring out definite inconsistencies in test results and demonstrate the more obvious shortcomings of ground test simulation in this type of experiment research. Test results indicate that the 10-degree cone configuration is dynamically stable over the entire scope of matrix variables covered in the experimental program. Dynamic instabilities observed in flight remain unconfirmed by these ground test results. (Author)
AD-650 866 HC$3.00 MF$0.65

HYPERSONIC DYNAMIC STABILITY. PART III. UNSTEADY FLOW FIELD PROGRAM.
Final rept., May 63-Jun 64
General Electric Co Philadelphia Pa Missile and Space Div
H. Rie, E. A. Linkiewicz, and F. D. Bosworth.
Jan 67, 306p
AFFDL-TDR-64-149-Pt-3
Contract AF 33 (657)-11411
See also AD-650 866.

Descriptors: (*Reentry vehicles, Stability), (*Hypersonic flight, Reentry vehicles), (*Flow fields, Atmosphere entry), Computer programs, Dynamics, Boundary layer, Bodies of revolution, Supersonic flight, Perturbation theory, Angle of attack, Pitch (Motion), Programming (Computers).

A method of computing static and dynamic force and moment coefficients was prepared. The method provides for a complete inviscid flow field solution to be computed on the IBM 7094 machine. The solution provides values of all pertinent flow field parameters at a large number of points in the shock layer surrounding a pointed or spherically blunted body of revolution (or the analogous two-dimensional shapes) in supersonic or hypersonic flight. Perturbations (of each flow field parameter) due to angle of attack, rate of change of angle of attack, and pitch velocity are also computed. The force and moment coefficients are obtained by integrating the appropriate perturbations in pressure over the body surface. The above flow field capabilities were delivered in the form of magnetic tapes. A sample solution was demonstrated on the Wright-Patterson AFB computer installation on June 30-July 1, 1964. The analysis and programming of this solution is described. (Author)
AD-650 879 HC$3.00 MF$0.65

AN EXAMPLE OF THE ANALYSIS OF SATELLITE BUNCHING CHARACTERISTICS,
Rand Corp Santa Monica Calif
G. M. Northrop. Feb 67, 122p Rept no. RM-5156-PR
Contract F44620-67-C-0045

Descriptors: (*Orbital trajectories, *Communication satellites (Active)), (*Space communication systems, *Circular orbit trajectories), Data processing systems, Computer programs, Management engineering, Iterative methods, Systems engineering, Defense systems.

The memorandum presents an ad hoc analytical iterative procedure that can be used to establish a desirable relative spacing scheme for families of satellites in unperturbed, unphased, circular, coplanar orbit. Extension of this analytical technique to families of satellites in noncircular coplanar orbit is straightforward. The threefold aim of the Memorandum includes: extension and illustration of an earlier preliminary study; analysis of a practical example (viz., one launch of the IDCSP), with sufficient detail to afford both system managers and analysts insight into the nature of bunchings of satellites in circular, coplanar orbit; and presentation of some procedures and criteria for determining relative spacing between adjacent satellites in the family to give satisfactory system characteristics.
AD-650 905 HC$3.00 MF$0.65

NUTATIONAL STABILITY OF MULTI-BODY SPIN-STABILIZED SATELLITES.
Technical rept.,
Royal Aircraft Establishment Farnborough (England)
W. G. Hughes. Jan 67, 14p Rept no. TR-67009

Descriptors: (*Satellites (Artificial), Stability), (*Attitude control systems, Spin stabilization), (*Spin stabilization, Satellites (Artificial)), Rotation, Energy, Damping, Momentum, Great Britain.

Conditions are derived for the nutational stability (i.e. for the state of motion to converge to the desired simple spin condition) for multi-body vehicles, relative rotations of the bodies being permitted about a common axis, which is also the desired spin axis. Simultaneous energy dissipation (or injection) in all bodies is covered, confirming ideas which could only be conjectured from previous work. In particular it is shown that moment of inertia ratios will normally be unimportant if the nutation damper (assumed dissipative) is mounted on a 'de-spun' platform. This permits flexibility of design in satellites which are essentially three-axis stabilized but have, by the provision of a spinning part, the desirable features of a spin-stabilized vehicle. (Author)
AD-650 943 HC$3.00 MF$0.65

THE EXCITATION OF ELECTRONIC AND OTHER DEGREES OF FREEDOM IN A HYPERSONIC SHOCK WAVE IN AIR.
Institute for Defense Analyses Arlington Va Research and Engineering Support Div
For primary bibliographic entry see Field 20D.
AD-650 950 HC$3.00 MF$0.65

THE HYPERSONIC WAKE PROGRAM I. A FORTRAN PROGRAM FOR THE INTEGRAL SOLUTION,
Army Missile Command Redstone Arsenal Ala Advanced Systems Lab
For primary bibliographic entry see Field 20D.
AD-651 159 HC$3.00 MF$0.65

PERTURBATIONS OF AES ORBITS FROM TESSERAL HARMONICS OF GRAVITATIONAL POTENTIAL EXPANSION.
Vozmushcheniya Orbit Isz Ot Tesseral'nykh Garmonik Razlozheniya Gravitatsionnogo Potentsiala Volt Technical Corp., Washington, D. C.
A. M. Zhandarov. 8 Mar 67, 8p NASA-CR-83564, ST-CM-10571
Contract NAS5-12487
Transl. Into English From Kosmich. Issled. (Moscow), V. 5, No. 1, 1967 P 3-7

Descriptors: *Gravitational potential, *Orbit perturbation, *Tesseral harmonics, Axisymmetry, Earth, Equation, Expansion, Gravitational, Harmonics, Motion, Orbit, Perturbation, Potential, Tesseral, Transformation.

For abstract, see STAR 05 11.
N67-22299 HC$3.00 MF$0.65

ORBITAL AND HIGH ALTITUDE PROBING POTENTIAL OF GUN LAUNCHED ROCKETS.
Mcgill Univ., Montreal (Quebec). Space Research Inst.
For primary bibliographic entry see Field 4A.

For abstract, see STAR 05 11.
N67-22465 HC$3.00 MF$0.65

SOME CONVENIENT FORMULAE FOR THE TRAJECTORY OF A SPACE PROBE APPLIED TO LUNIK I.
Royal Aircraft Establishment, Farnborough (England).
G. B. Longden. Aug 63, 50p RAE-TN-SPACE-40

Descriptors: *Hyperbolic orbit, *Lunik i lunar probe, *Missile trajectory, *Trajectory analysis, Altitude, Analysis, Ballistics, Earth, Flight, Hyperbola, Lunar, Missile, Moon, Orbit, Probe, Time, Trajectory, Velocity.

For abstract, see STAR 05 11.
N67-22715 HC$3.00 MF$0.65

GEOMETRIC THEORY OF OPTIMUM DISORBIT PROBLEMS.
Colorado Univ., Boulder.
A. Busemann, and N. X. Vinh. Apr 67, 50p
NASA-CR-750
Contract NGR-06-003-033

Descriptors: *Orbit equation, *Trajectory analysis, Analysis, Atmosphere, Entry, Equation, Orbit, Planet, Trajectory.

For abstract, see STAR 05 11.
N67-22778 HC$3.00 MF$0.65

GRAPHICALS METHODS FOR ORBIT CALCULATIONS OF SATELLITES.
Graphische Methoden Zur Ermittlung Der Bahnen Von Erdsatelliten
Deutsche Versuchsanstalt Fur Luft- Und Raumfahrt, Oberpfaffenhofen (West Germany). Inst. Fuer Flugfunk Und Mikrowellen.
E. Baeger. Jan 67, 68p DLR-FB-67-03
in German

Descriptors: *Graph, *Radio observation, *Satellite orbit, Calculation, Communication, Earth satellite, Ground, Observation, Orbit, Radio, Satellite, Station.

For abstract, see STAR 05 11.
N67-22965 HC$3.00 MF$0.65

AN APPROACH TO THE PROBLEM OF OPTIMIZING ORBITAL MANEUVERS.
Colorado Univ., Boulder.
A. Busemann, and R. D. Culp. Dec 66, 51p
NASA-CR-83544
Contract NGR-06-003-033

Descriptors: *Gravitational field, *Orbit, *Spacecraft maneuver, Calculus, Coaxial, Coplanar, Field, Gravitational, Hamiltonian, Maneuver, Motion, Optimization, Spacecraft, Thrust, Variation, Velocity, Wave.

For abstract, see STAR 05 11.
N67-23271 HC$3.00 MF$0.65

MINIMAL ENERGY BALLISTIC TRAJECTORIES FOR MANNED AND UNMANNED MISSIONS TO MERCURY.
National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
L. A. Manning. Apr 67, 32p NASA-TN-D-3900
Contract 130-06-04-03-21

Descriptors: *Ballistic trajectory, *Manned space flight, *Mercury project, *Unmanned spacecraft, Ballistics, Energy, Flyby, Manned, Minimum, Orbiter project, Reentry, Space flight, Spacecraft, Trajectory, Transfer, Unmanned, Velocity.

For abstract, see STAR 05 11.
N67-23291 HC$3.00 MF$0.65

LONGITUDINAL AERODYNAMIC CHARACTERISTICS OF SEVERAL HIGH-DRAG BODIES AT MACH NUMBERS FROM 1.50 TO 4.63.
National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
For primary bibliographic entry see Field 1A.
For abstract, see STAR 05 11.
N67-23295 HC$3.00 MF$0.65

A NEW METHOD FOR TREATING OPTIMAL TRAJECTORIES WITH RESTRICTED SEGMENTS.
Arizona Univ., Tucson.
J. D. Mason, and T. L. Vincent. Apr 67, 67p
NASA-CR-744
Grant NSG-580

Descriptors: *Euler equation, *Flight mechanics, *Lagrange multiplier, *Space mechanics, *Trajectory optimization, *Variational calculus, Bolza problem, Calculus, Constraint, Corner, Equation, Flight, Hamiltonian, Mechanics, Motion, Optimization, Point, Space, State, Trajectory, Variable, Variation.

For abstract, see STAR 05 11.
N67-23306 HC$3.00 MF$0.65

NECESSARY CONDITIONS FOR OPTIMAL LUNAR TRAJECTORIES WITH DISCONTINUOUS STATE VARIABLES AND INTERMEDIATE POINT CONSTRAINTS.
National Aeronautics and Space Administration. Electronics Research Center, Cambridge, Mass.
J. F. Andrus, and W. E. Miner. Apr 67, 42p
NASA-TM-X-1353
Contract 129-04-04-07-25

Descriptors: *Lunar trajectory, *Optimal control, *Trajectory optimization, *Variational calculus, Bolza problem, Boundary, Calculus, Constraint, Control, Equation, Euler-Lagrange equation, Guidance, Lunar, Multistage, Optimal, Optimization, Point, Problem, State, Theory, Trajectory, Value, Variation.

For abstract, see STAR 05 11.
N67-23335 HC$3.00 MF$0.65

22D. SPACECRAFT LAUNCH VEHICLES AND GROUND SUPPORT

HANDHELD SPACE SEXTANT OPERATING MANUAL.
Kollsman Instrument Corp., Elmhurst, N. Y. Space Div.
Jun 66, 67p NASA-CR-73072
Contract NAS2-2706

Descriptors: *Battery, *Ground support equipment, *Manual, *Optical instrument, *Sextant, Calibration, Equipment, Ground, Instrument, Instrumentation, Method, Operation, Optical, Procedure, Spacecraft, Support, Test.

For abstract, see STAR 05 11.
N67-22065 HC$3.00 MF$0.65

ELDO TECHNICAL REVIEW, VOLUME I, NO. 3.
European Space Vehicle Launcher Development Organization, Paris (France).
1966, 92p
in French and English

Descriptors: *Computer simulation, *Launching device, *Propellant chemistry, *Telemetry, Analog, Chemistry, Code, Computer, Device, Guidance, Launching, Lock, Loop, Modulation, Phase, Propellant, Pulse, Simulation, Space, Test, Vehicle.

For abstract, see STAR 05 11.
N67-22491 HC$3.00 MF$0.65

REPORT ON DIGITAL COMPUTERS USED IN AUTOMATIC CHECKOUT.
National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
B. Funderbunk. 16 Mar 67, 158p NASA-TM-X-53590

Descriptors: *Checkout equipment, *Digital computer, *Hardware, *Space vehicle checkout program, Automatic, Checkout, Computer, Digital, Equipment, Evaluation, Ground, Instrumentation, Program, Saturn i launch vehicle, Saturn v launch vehicle, Software, Space vehicle, System.

For abstract, see STAR 05 11.
N67-22843 HC$3.00 MF$0.65

FEASIBILITY STUDY OF STORAGE CONCEPTS FOR SCOUT AND OTHER NASA SOLID PROPELLANT LAUNCH VEHICLES.
LTV Aerospace Corp., Dallas, Tex. Missiles and Space Div.
R. D. Fielder, and H. N. Nesbitt. Apr 67, 153p
NASA-CR-66321
Contract NAS1-6748

Descriptors: *Facility, *Flight condition, *Scout launch vehicle, *Storage, Condition, Container, Cost, Estimate, Feasibility, Flight, Launch vehicle, Propellant, Solid.

For abstract, see STAR 05 11.
N67-22887 HC$3.00 MF$0.65

ANALYTICAL AND EXPERIMENTAL DETERMINATION OF LOCALIZED STRUCTURE TO BE USED IN LABORATORY VIBRATION TESTING OF SHELL STRUCTURE-MOUNTED COMPONENTS, SATURN V PROGRESS REPORT, MAY - NOV. 1966.
Northrop Corp., Hawthorne, Calif. Norair Div.
C. Hwang, and W. S. Pi. Jan 67, 155p NASA-CR-83527, NOR-67-19
Contract NAS8-20025

Descriptors: *Computer program, *Finite difference method, *Saturn v launch vehicle, *Shell, *Vibration testing, Component, Computer, Design, Difference, Finite, Localization, Method, Mount, Procedure, Program, Response, Structure, Testing, Vibration.

For abstract, see STAR 05 11.
N67-23253 HC$3.00 MF$0.65

COMPOUND PRESSURE AND VACUUM RELIEF VALVE, 2-INCH, LADEWIG VALVE COMPANY PART NUMBER 3302- F, NASA DRAWING NUMBER 75 M04406 PRV-3.
Chrysler Corp., New Orleans, La.
For primary bibliographic entry see Field 13K.
For abstract, see STAR 05 11.
N67-23278 HC$3.00 MF$0.65

REPORT LOCATOR LIST

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12A	PB-174 505
12A	PB-174 506
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2F	PB-174 510
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